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JPRS-UMA-85-024

27 March 1985

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USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 1, January 1985

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27 March 1985

USSR REPORT
MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No. 1, January 1985

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

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MOSCOW MD AIR FORCES CHIEF EXPLAINS COMMANDER AUTHORITY, RESPECT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 1-3

[Article by Honored Military Pilot USSR Col Gen Avn I. Dmitriyev, commander of air forces, Order of Lenin Moscow Military District: "Commander's Authority"]

[Text] A new unit commanding officer has been appointed. What kind of a person is he? What is his degree of professional competence? How is he at working with people? These and other, sometimes the most unexpected questions are of interest to his subordinates not out of idle curiosity. They want to know with whom and under whose authority they will be living, working, training and, if necessary, going into battle. The new commanding officer in turn is no less interested in what kind of a outfit this is that he will be heading up, what kind of relations with the men he will be able to establish, and how can he more rapidly determine the strong and weak points in their activities, unite his subordinates, and carry out assigned tasks in an amicable fashion.

There is no doubt about the fact that the greater the authority and respect the commanding officer enjoys from his men, the more effectively he will be able to accomplish the targets pertaining to combat and political training, military indoctrination of personnel, increased air, weapon and tactical proficiency on the part of aircrews, as well as subunit and unit combat readiness.

Col A. Mazepo has commanded his unit for several years now. He is an experienced commander, a skilled indoctrinator and mentor of young aviators, a fine organizer and methodologist, and a solicitous and demanding superior, enjoying deserved respect from his men. In the past training years the men of the regiment under his command successfully accomplished assigned tasks, achieved plan fulfillment in all indices, attained high results in socialist competition, and have made a good, solid start for the new training year. A good deal of the credit for the outfit's success goes to Colonel Mazepo, who has succeeded in uniting aviation personnel, inspiring them to accomplish their difficult, important tasks, and through personal example has inspired them to achieve excellent results in military labor.

The authority, image of and respect for the commander -- a Communist with sole command responsibility -- is, one can say, a decisive factor in the operational efficiency of the military unit. Observations confirm that the leader definitely exerts influence on people within the framework of his authority. And it is quite logical that the question of the commander's authority and the strength of his influence on his men is of exceptionally great significance.

Just what determines this strength? On what does it depend? Two characteristic aspects are clearly distinguished within the structure of commander authority: authority of office, and respect for the individual. The authority of office is determined by the leader's position and is formally articulated by the rights and obligations specified by Soviet laws and military regulations. When appointed by the socialist state to a leadership position, an officer is given certain authority over the persons who make up the given military collective. Thus he becomes the bearer of authority of office, which is of a political, governmental nature. It does not formally embody the individual qualities of the leader, but its magnitude is defined by the measure of public acknowledgment of that role which is played by the Air Forces within the national defense system.

Another aspect of commander authority is personal influence and respect. Vladimir Il'ich Lenin drew particular attention to the necessity of differentiating the influence of the individual from the authority of the leader's position and rank. An officer's personal charm, attentiveness toward others, responsiveness and kindness, his ability to give help at a difficult moment, as well as other finer human qualities unquestionably enhance an individual's image and reputation and help exert a positive influence on his subordinates. This image and reputation is not appended to the orders appointing him to a leader slot. It is earned by profound knowledge, hard work and, as V. I. Lenin stressed, "by his energy, his ideological influence (but of course not by his ranks and titles)...." The respect enjoyed by the individual reflects the officer's genuine virtues and is determined first and foremost by ideological maturity, ideological conviction and devotion to Communist ideals, adherence to the lofty principles of socialist ethics and morality, and an officer's honor and organizing ability.

In addition, in order to have the moral right to command personnel, the aviation commander should possess thorough knowledge of military and specialized subjects, should have a good grasp of education science and psychology, operational art and tactics, should be able to fly proficiently in all conditions, bomb, shoot and fire rockets and missiles unerringly, and have the ability to teach this effectively to others. Commanders who embody party-mindedness and competence, practicalness and businesslike efficiency, initiative and independence, unaffectedness and modesty, a high degree of demandingness on themselves and subordinates, who are able to find common ground in communicating with their men and to rely on their experience and knowledge enjoy the undisputed respect of their men.

The respect for and authority of the commander are affected by everything: how he makes a decision and issues instructions, how he verifies execution, how he talks with his subordinates and superiors, how he organizes his working day

and the labor of his men, in what he takes an interest, how he prepares for and directs flight operations, how diligent he is at his job, how honest and upright he is in his doings, his neatness and smartness of bearing. The commander is in full view at all times, and his attitude toward his job, and his manner of conduct -- everything is noticed by the others in his outfit and is appropriately assessed. If he is haughty and rude, if he ignores the opinion of his subordinates, if he claims the accomplishments of the collective as his own personal accomplishments, sooner or later this will be manifested in the most undesirable manner. A commander with moral/ethical flaws, regardless of his breadth of knowledge and professional skills, will not enjoy genuine respect and authority on the job, and consequently will not exert the requisite influence on his subordinates.

Authority of office and individual authority and respect should comprise a unified whole. Otherwise the formal status of the leader comes into conflict with subordinates' actual attitude toward him. And this does not help in forming a favorable moral-psychological climate in the collective and cannot exert the desired influence on effective and high-quality accomplishment of the combat training tasks assigned to personnel.

A commander who has lost the essential moral-political, professional and moral/ethical qualities definitely does harm to the cause of training and indoctrination of his men. Having failed to gain personal authority and respect, he attempts to fill in the gap with the authority of his office. But as a result interrelationships within the collective become strained as a rule, various conflict situations arise, and trust in and respect for the commander diminish.

On the other hand, the commander's moral/ethical virtues, his humanity and high degree of professionalism enhance his degree of authority and respect and strengthen in his men confidence that they are commanded by an individual who is not indifferent to the common cause and the fate of each individual. The leader, stressed V. I. Lenin, "should possess the highest degree of ability to attract others and a sufficient degree of solid scientific and technical knowledge to verify their job performance. This is the main thing." Thus a commander's professional preparedness contains faithfulness to the principles of Communist morality, a feeling of collectivism, and a strong sense of responsibility for everything done by the collective and by the commander himself.

In military aviation the personal example of the commander has always been a most important principle of training and indoctrination of subordinates. If the commander himself has an interested, committed and involved attitude toward his job, if he is constantly working to increase his knowledge, his methodological and job-related skills, this inevitably exerts a positive influence on his subordinates. Regimental commander Col A. Mazepo, for example, when working to master an aircraft which was new to him, would thoroughly examine its design and aerodynamic features, thoroughly study aircraft systems and armament, and learn the fine points of their combat employment. The officer did not limit himself merely to the literature and appropriate documents, but talked in detail with the specialists, who gave him effective, skilled assistance.

After executing each new maneuver sequence in the air, the commanding officer would thoroughly analyze the flight recorder tapes. This enabled him to hone his technique of flying the new aircraft as well as combat maneuvers and tactics. He now skillfully passes on his knowledge and know-how to his men. If his pilots makes mistakes, he helps determine their causes and ways to correct them. In this regiment the flight debriefing and critique is a genuine school of professional and methods expertise.

In order successfully to lead the outfit in his care, the commander should possess organizer abilities, the gift of foresight, should have the ability to determine the main thing in his work and to guide the efforts of his men toward unconditional execution of designated plans and schedules. Colonel Mazepo, supported by the party organization, has succeeded in uniting and consolidating the outfit he leads, in mobilizing its energies toward accomplishing the principal task -- increasing the operational efficiency and combat readiness of the subunits. Displaying paternal concern for his men's interests and needs, he constantly bears in mind the great responsibility which rests on his shoulders for organization of the men's daily life and activities, for developing in them the highest degree of moral fiber and professionalism, without which there cannot be a genuine fighting man and defender of the socialist homeland.

The organizing abilities of the commander, political worker, and officer-leader at any echelon are grounded on responsibility. It is precisely responsibility which bonds and cements all their other elements. If a commander is lacking an adequate sense of responsibility, however, if he does not greatly care for the job at hand and for his subordinates, no knowledge, even the most profound, no enthusiasm or job fitness, or other positive qualities will enable him successfully to lead his men.

Regret and annoyance are aroused by the actions of that commander who is always playing it too safe, who is endlessly coordinating, refining, and settling something. Concealed behind all this is nothing other than fear of responsibility and a lack of independence. And when one must definitely answer for mistakes and errors of omission, such a commander attempts to find an indirectly culpable individual and to dump onto his shoulders all existing and nonexistent flaws. Naturally such actions have nothing in common with our socialist ethics and morality, evoke in the men a feeling of bitterness and discontent, have a ruinous effect on the collective, diminish the authority of and respect for the commander, and discredit the lofty title of leader.

But what is needed is not talk about responsibility, which will scarcely produce benefit, but concrete deeds. Many various problems arise in life, where it is of primary importance to understand them well, to get to their very substance, and then to make an intelligent decision and complete the job. Sometimes definite courage is required of a leader to defend his opinion, which at times is at variance with the way his superior sees things. And in order to defend one's opinion it is necessary to be competent, to be thoroughly familiar with the situation, to be able to bring forth precise, specific reasoning and calculations, and to be confident in the correctness of

a decision one has made. An aggressive experiential posture and genuine party-minded firmness on the part of a leader is manifested precisely in this.

Regimental deputy commander for political affairs Lt Col A. Kuznetsov has the men's total respect. He is a knowledgeable political worker, a first-class pilot who loves his profession, a skilled organizer of party political work, and a tireless implementer of Communist Party policy among personnel. This vanguard officer knows the men well, is familiar with their interests and aspirations, the tasks assigned to the subunits and unit, and is able to communicate with the men and to inspire them to accomplish specified performance levels in combat readiness. He is proficient as an instrument instructor and as an instructor in all categories of combat employment. When necessary, he is fully capable of assuming command and control of the unit.

At last year's exercises the situation developed in such a manner that Lieutenant Colonel Kuznetsov had to direct all organizational measures at the airfield. And a great deal of work had to be accomplished. He had to place his men, organize supply and provision of all requisite items, and to get the men into a mood for successful combat performance.

The exercise was distinguished by exceptional intensity. Aircrews performed missions in close coordination with ground forces, supported tank and motorized rifle subunits, and delivered heavy bomb and rocket strikes on specified targets on the battlefield and at tactical depth in the "aggressor's" defense. Missions were flown at night, at dusk, and during daylight hours in instrument meteorological conditions.

Lieutenant Colonel Kuznetsov, working together with the party committee secretary, skillfully placed party activists and organized regular coverage of exercise progress in visual agitation materials. The men were kept continuously current on all doings and events. During the exercise the deputy commander for political affairs himself led groups on missions, and between sorties he found time to prepare political reports on performance results and to pass them on to the higher-echelon political agency. The regimental commander, who was at the command post during this time, was placid: wherever his deputy commander for political affairs happened to be, order, a high degree of discipline and organization were sure to prevail.

The men of this outfit received high marks from the command authorities for successful accomplishment of the assigned missions. A good deal of the credit for this goes to Lieutenant Colonel Kuznetsov, who displayed a high degree of professional competence, a correct understanding of the developing situation, and the ability to mobilize the outfit and to direct it intelligently. The political worker's excellent organizing ability, his personal sense of responsibility for the success of the collective, his strong moral fiber and professional skill -- qualities which have gained him a great deal of respect -- were clearly evident in his job performance.

We should like to note a very important detail at this point. The Air Forces are a special, highly specific branch of the USSR Armed Forces. In aviation units commanders and flying political workers are judged primarily on their moral-political and job-performance qualities. If an officer has gaps in his

job proficiency, if he has an insufficiently self-critical attitude toward his flight training, if he makes a miscue in his personal conduct, the authority and respect he is given is low as a rule. This particularly applies to pilot-political workers. A deputy commander for political affairs should be a highly-proficient combat pilot, a well-educated, culturally-accomplished officer, who has a good grasp of military, political, and specialized matters. If a political worker does an excellent job of flying in all conditions, is well prepared as an instructor, possesses good methods skills and a professional grasp of matters pertaining to tactical control, this unquestionably gives him the moral right to lead others by personal example. Subordinates have much greater respect for such a political worker and go to him with not only personal, household matters but job-related problems as well. "The force of the moral example of the Communist, especially the leader-Communist, is great," stressed CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet. "The spotlight is always on him as far as the masses are concerned, and the higher the position that he occupies, the greater the responsibility on his shoulders."

In my opinion those units in which the finest flight commanders, who are trained as instructors, are nominated for the position of squadron deputy commander for political affairs are proceeding absolutely correctly. A deputy commander for political affairs who is excellently trained and prepared in a professional respect provides real support to the commanding officer in all matters without exception. An organic combination of a high degree of professionalism and moral fiber with an understanding of the men's interests and needs, taking their opinions and attitudes into account, becomes the foundation of moral authority.

The high degree of authority and respect enjoyed by the leader is not his personal affair. It has social significance, and consequently directly affects people's operational efficiency and subunits' combat readiness. During severe ordeals, when our people were compelled with weapon in hand to defend the honor, freedom and independence of the homeland, to defend the sacred right to life, Soviet pilots proved by deeds their faithfulness to Communist ideals, their devotion to the socialist homeland, and hatred toward its enemies. Our glorious commanders and political workers always marched at the forefront. They were the first to enter battle and to mete out devastating blows to the enemy, drawing along their men by personal example, displaying amazing examples of courage and valor as well as selfless execution of their military duty. During the years of the Great Patriotic War thousands upon thousands of Soviet aviators were awarded the title Hero of the Soviet Union for their combat feats and were awarded lofty government decorations.

In the present very complex international situation, our commanders, political and engineer-technical cadres are faced with a most important task -- to do everything to ensure that personnel fully master aircraft and weapons in a short period of time and learn to utilize them effectively in combat, to raise vigilance and combat readiness to the very highest levels.

Our aviation personnel understand well what a great responsibility they bear for the safety of the homeland. In their daily military routine they improve

their professional expertise, boost their moral-political and psychological conditioning, and strengthen organization and discipline. Their strong moral fiber and patriotism and their devotion to the powerful traditions of the Air Forces, reliably guarding the achievements of socialism, are manifested in surmounting the difficulties of combat training and in the daily intensity of socialist competition.

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HELICOPTER GUNSHIP MOCK GROUND-SUPPORT STRIKE DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 4-5

[Article by Capt A. Zhilin: "With a Precise Strike"]

[Text] Just before dawn the silent air base was awakened by the signal to assemble, and soon aviation personnel were gathered at the designated point. Personnel mounted up, and the motor convoy headed for the airfield. A tactical air exercise had begun.

An unfavorable situation was developing for the defending motorized rifle subunits. The "aggressor," persistently attacking the defensive positions, was steadily building up his efforts. Reconnaissance had detected in a timely manner movement by his reserve tank group into a strongpoint flank. Well aware that a difficult tactical situation was developing on the battlefield, the commander of the motorized riflemen requested air support via the senior-level commander.

At the airfield the helicopters stood poised in combat readiness. The aviation engineer service specialists had readied the helicopters quickly and competently for the impending mission. Aircrews once again refined the details of the forthcoming missions and stood ready to take off immediately when the word came.

...At the designated time a two-ship element appeared over the battlefield, led by Military Pilot 1st Class Lt Col V. Belyakov. Aware that success depended entirely on the element of surprise, the leader had selected his route in such a manner as to take maximum advantage of terrain concealment and gaps at the points of juncture between the combat formations of the advancing subunits.

The helicopters' extremely low-level flight was supported by brief periods of heavy artillery shelling and laying of smoke screens at a feint counterattack point. This enabled the helicopters to reach their targets undetected.

The two helicopters separated just prior to initiating their target run. After executing an antiaircraft evasive maneuver, Lt Col V. Belyakov hit the tanks, which were redeploying into approach march formation. In response the

tankers opened fire with antiaircraft machineguns. It is no easy task, however, to hit a maneuvering helicopter with a machinegun burst fired from a moving tank. In addition, the helicopter piloted by Maj A. Pantyukhin, suddenly and unexpectedly appearing from a different direction, hit them with a devastating attack. After flying an additional attack run, the pair, flying at treetop level, dipped behind a ridge. The "aggressor's" attack in the breakthrough sector had been broken up.

The successful combat sortie noticeably buoyed the aviators' spirits. As they prepared for another sortie, however, they realized that it would now be more difficult to achieve the element of surprise. The "aggressor" was expecting an air attack and would take all steps to repulse it.

The situation was heating up. In spite of heavy "losses," the tankers again undertook an attempt to break through the motorized riflemen's defense. To accomplish this, taking advantage of the onset of darkness, they concentrated new forces on the main axis of advance.

Working in coordination with the higher-echelon commander, Lieutenant Colonel Belyakov decided to alter the prior-devised plan. Scouting out a site, aviation personnel deployed helicopters in a small forest glade. Lofty pines solidly concealed the helicopters from "hostile" radar surveillance.

The site had been chosen well. The glade was situated on an unlikely avenue of tank approach, close to a road running perpendicular to the battle line, a road which intelligence indicated that the "aggressor" was planning to use to engage his reserves.

...The minutes of waiting dragged on agonizingly. Finally the prearranged signal was given. A pair of fire-support helicopters suddenly appeared over the treetops and delivered a bold, lethal strike. The crimson flames issuing from the rockets, heading toward the marching column, seemed especially bright against the dark terrain background.

Breaking off the attack, the helicopters withdrew at treetop level in order to evade return fire. Soon the motorized riflemen commenced a massive counteroffensive action, which ended in defeat in detail of the attacking "aggressor" force.

In summarizing tactical air exercise performance results, the combined-arms commander expressed thanks to Lt Col V. Belyakov's men, while the flight leader himself was given a valuable memento for his skilled and tactically competent actions.

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IMPORTANCE OF GCI CONTROLLER-INTERCEPTOR PILOT COORDINATION EMPHASIZED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 4-5

[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Lt Col A. Bedzhanyan: "...Responsibility Also Equally Divided"]

[Text] The fighter was in position on the runway and holding. Cleared for takeoff, the pilot rolled and lifted off. Once airborne, he contacted the command post by radio and, receiving the requisite data from the tactical control officer, established the designated mission configuration. From this moment on the pilot was working in close coordination with the command post and would be under his supervision until reaching the destination airfield. The tactical control officer would help the combat pilot spot the target and deliver an accurate strike.

Specialist 1st Class Capt P. Shuranskov was seated at the plan position indicator. He had excellent ability to foresee development of the air environment and quickly to choose the optimal guidance variation taking many components into account, including the individual pilot's proficiency level.

At one tactical air exercise, for example, Captain Shuranskov was given the task of vectoring fighters to targets. The first to execute the intercept was acknowledged expert flier Military Pilot 1st Class Maj M. Vershelis. The officer realized that if he vectored the pilot according to the conventional pattern, the "adversary," also an experienced combat pilot, might spot the closing fighter in advance and evade the attack. Some new tactical attack configuration was needed. Captain Shuranskov found it and briefly communicated his scheme to the pilot.

The outcome of the contest now depended in large measure on precise calculation and exceptional alertness on the part of the command post officer and on the pilot's ability to execute a maximum-performance turn. As the tactical control officer had presumed, Major Vershelis executed it flawlessly. Scarcely had the interceptor brought its wings back to level when the aircraft reached missile launch range. The target blip was precisely centered in the sight.

"Locked on.... Missile away!" the pilot reported to the ground.

The "aggressor" was stunned by the sudden, unexpected attack.

Today aerial combat has taken on many new features and has become much more intense and dynamic. The time factor, which in the past also played a considerable role, today has become even more significant. In air combat the endeavor to gain seconds or even fractions of a second is essentially a struggle for victory. Consequently such qualities as swift reaction, initiative, and tactical sharpness, grounded on thorough knowledge of the aircraft and aerodynamics, are just as essential to command post officers as they are to pilots. Unquestionably these qualities can be developed only in the course of intensive daily training activities and practice drills, in flight operations, and at exercises, in an environment maximally approaching actual combat.

Unfortunately in some aviation outfits command post specialist personnel do not happen to give particular thought to calculations of navigation-tactical points with various changes in the air environment and vectoring variations. Everything is known in advance, just as, incidentally, are the routes and flight path configurations of the target aircraft.

The following example persuasively demonstrates the potential result of an excessively simplified approach to training. Capt R. Gol'din felt confident prior to the commencement of a tactical air exercise. He had years of experience as a tactical control officer. His level of theoretical preparation received the highest marks, and he had a good many actual ground controlled intercepts under his belt. It would seem that success was guaranteed in advance. But the air environment became more complex as flight operations progressed. A report suddenly came in from the warning network: a "threat" was approaching the flight operations area. The circumstances required halting scheduled training flights and concentrating all attention on intercepting the "aggressor." Gol'din, however, who was unaccustomed to such scenario changes, lost his composure for a certain time and was late in issuing the requisite commands. This officer's unsureness and nervousness affected his assistants. As a result the mission assigned to the interceptors was almost a failure.

One cannot state that regular practice drills and brief tactical exercises were not being conducted with Captain Gol'din's command post team. But they were too monotonous, with "threats" following predetermined routes, and in addition without employment of jamming. Quite frankly, such practice sessions produced little benefit. And yet in order to create favorable conditions for attack at maximum performance, in conditions of heavy hostile jamming, the tactical control officer must continuously expand his tactical knowledgeability and improve his job proficiency. Constant changes are taking place in tactics as aircraft and weapons continue to evolve. Therefore experienced command post officers in charge place emphasis on practicing ground controlled intercepts at all altitudes, in conditions of jamming, and when devising practice drills they incorporate sudden changes in the air and meteorological environment, so that every command post specialist gains the ability to adjust quickly, figuratively speaking, from a normal to a "boosted"

work intensity, performing with precision and composure all calculations pertaining to command and control of airborne aircrews.

For example, command post officer in charge Capt P. Shuranskov approaches the job in a thoughtful and innovative manner. Highly-dynamic practice sessions and study of the "adversary's" tactics, and also modes of control of friendly fighters as well, expand his men's professional knowledgeability and make their training interesting.

The following incident occurred. Instructions were received from the higher-echelon command post to track a group of aircraft. At first it seemed that everything was going well. The pilots were precisely maintaining their designated route of flight. Suddenly the tactical control officer noted that the aircraft's speed was slower than prescribed. He contacted the group leader by radio. The latter replied that indicated airspeed was normal. What was the problem? It was ascertained that the pilots had failed to correct for a strong headwind at the group's flight level. The tactical control officer immediately requested weather data from the weather forecasters and performed the required calculations, which indicated that at the current settings they might not have enough fuel to reach their home field. The decision was made to land the aircraft at an intermediate field. Thus they succeeded in averting an emergency situation.

They also have a highly responsible attitude here regarding the conduct of immediate preparation of command post specialist personnel. The maneuver sequences scheduled for flight operations are thoroughly studied and run through on plotting boards and special equipment in the course of immediate preparation. Matters pertaining to command and control are detailed and refined, and the requisite points and figures for diverting to alternate fields in case of change in weather conditions are specified and computed. Detailed immediate preparation is also essential because tactical coordination between pilots and command post specialist personnel is worked on at this time. Frequently Capt P. Shuranskov and the other CP officers practice on simulators, performing the role of pilots. Their "flight" program includes various maneuvers which simulate the elements of actual flight, which enable them to gain better understanding of the specifics of flying activity and consequently to perform with greater confidence and precision when controlling aircrews.

One item of no little importance, which is directly related to the professional training of CP officers, is the matter of instilling in them a high degree of responsibility and determination. It is no secret that frequently the fighter pilot's initiative is entirely in the hands of the tactical control officer, since the latter, supported by data provided by modern radar equipment, is able to guide the interceptor into the attack according to the tactical configuration which is most advantageous in the specific situation. At the same time the tactical control officer is constantly concerned by the following question: is the pilot prepared for a given maneuver? Especially when air combat is fought at maximum performance, when a certain amount of warranted risk must be taken. In such situations the CP officer is subjected to enormous nervous stress, for the result of air

combat is also a grading of his ability to assume responsibility for the engagement outcome.

It sometimes happens that a tactical control officer cannot bring himself to display initiative and is not anxious to tempt fate, as they say. And the point here is not a lack of tactical vigilance or GCI experience. It is simply the fact that he is well aware that if the intercept is unsuccessful, it is primarily he who will be blamed. And he reasons that it might be better to handle the intercept problem in a routine configuration.... As a result practical performance runs counter to the demands of modern air combat. The CP officer knows how to configure the attack more appropriately and unexpectedly for the "adversary" in a given situation, but he does not implement his knowledge and experience. It seems to me that this is a result of a patently erroneous view of the role of the pilot and CP specialist personnel in the course of air combat, a view which has taken root in some officers.

The sophisticated ground equipment employed by the experienced specialist personnel makes it possible reliably to monitor airspace and actively to affect the course and outcome of combat. To achieve this, there should be mutual understanding, close contact, and equal responsibility between CP officers and aircrews for the precision of air-to-air attacks. Today's combat demands a high degree of professional skill and the ability to think in a tactically knowledgeable manner and independently to make correct decisions and swiftly to implement them. This is equally important both for pilots and for command post specialist personnel. Success is guaranteed only by their precise and smoothly-coordinated joint work performance.

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TEST PILOT'S CAREER OUTLINED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec '84) pp 6-7 (cont)

[Article, published under the heading "A Word About Air-Force Veterans," by Lt Col (Ret) P. Gus'kov: "Guardsman's Toughness"]

[Text] Gds Sr Lt Konstantin Tayurskiy knew that the people in the regiment called him "tayezhnik" [taiga dweller], but he did not suspect that with time other words were added to this one until he just happened to overhear a certain conversation. Young pilot Pavel Gudoshnikov was asking navigator Ivan Sobolev why the commanding officer was called "twice roasted guards taiga dweller."

"He was born in Siberia, so he is a tayezhnik. Guards is guards. Twice roasted is because he has twice been in a burning aircraft," the navigator replied."

...It happened in 1943. The first occasion was that summer, in the skies over the Don, during breakthrough of the enemy's defense on the Mius. On that occasion he was wounded in the air. The second occasion was in the fall, near Melitopol, when they were flying on a mission to bomb a Dnieper crossing. It is frightening to be in the air in a burning bomber, for you have the responsibility of your comrades as well. When the emergency situation developed, the aircraft commander ordered his crew to bail out.

"Roger," the navigator and radioman-gunner answered in unison. "What about you?"

"The aircraft is flyable. I can't abandon it!"

"Then we're staying too!"

There was no time to argue, and he said to himself: "They'll jump when it gets hot!" But they did not jump. The burning aircraft landed in a field. As soon as the crew had jumped clear of the aircraft, it exploded.

Konstantin Tayurskiy served in the famed 135th Taganrog Red-Banner Orders of Kutuzov and Alexander Nevsky Guards Bomber Regiment of the three-times

decorated 6th Taganrog Guards Air Division. Following liberation of the Donbass and the Left-Bank Ukraine in April 1944, the regiment redeployed to the Crimea with a fighter escort. En route the crews performed combat missions.

They were to dive-bomb fascist artillery positions southeast of Sevastopol. Upon approaching the target they formed up into a column of flights. The enemy met the aircraft with dense antiaircraft-artillery barrage fire. The aircraft came out of their dive over the sea, where enemy fighters were waiting for them.

The aircraft flown by pilot A. Zaplavnyy took damage from a direct hit by an antiaircraft shell and began to fall behind the formation. Sensing an easy kill, two Focke-Wulfs pounced on him. Tayurskiy's aircrew hastened to the assistance of their imperiled comrades. Coming in shooting, they helped fight off the fighter attack. A battle-front newspaper wrote the following about the actions on the part of Tayurskiy's crew: "The guardsmen are guided in battle by Suvorov's rule: perish yourself, but save your comrade!"

Soon the regiment was assigned a new mission: to hit an enemy ship convoy in the Black Sea. Regimental commander Hero of the Soviet Union Gds Col D. Valentik led a group of nine aircraft. Tayurskiy's aircraft flew the left rear position in A. Pronin's flight. Eight escort fighters under the command of Hero of the Soviet Union Gds Maj V. Lavrinenkov joined the group at Sarabuz airfield. They crossed the coastline, headed out to sea, and set course westward.

Suddenly one engine on Tayurskiy's aircraft began missing. The aircraft was able to maintain position in the formation by boosting manifold pressure on the other engine, but it soon overheated and proceeded to emit smoke. The pilot was forced to throttle back. The bomber began falling behind. Tayurskiy reported the situation to his flight leader and requested permission to proceed on his own. The flight leader approved.

Upon approaching the target, the aircraft formed up into a column and proceeded to dive-bomb the convoy, one flight following the other.

As the single aircraft was approaching the convoy, the pilot was unable immediately to choose a target. Some of the ships were burning, while others were sinking.... The impression was that there was nothing remaining to be done. Then the pilot spotted a wake astern of one of the vessels.

"Let's hit him!" Tayurskiy exclaimed and put his aircraft into a dive.

The ship's crew spotted the attacking bomber. Oerlikons opened fire from the deck. The ship proceeded to maneuver. A frothy wake could be seen snaking astern. The bombsight crosshairs lay centered on the deck.

"You won't get away!" the pilot uttered through clenched teeth.

The sea was approaching rapidly. There was no force on earth which could deflect the aircraft from its bombing run. Tayurskiy pressed the release button and pulled back on the controls.

"Direct hit, skipper!" gunner-radio operator Leonid Inzhevavov shouted over the intercom.

This was how young Communist Guards Senior Lieutenant Tayurskiy celebrated that memorable day: that morning, just prior to departure, he was presented his party card. That same day the pilot flew another successful combat sortie. In a month of combat activity in the Crimea, Tayurskiy's aircrrew flew 21 bombing missions and fought 12 aerial engagements with enemy fighters.

At the end of May 1944 the regiment was redeployed to the Third Belorussian Front. The pilots bombed fortified enemy positions and troop concentrations.

While bombing fortifications on the Vitebsk bridgehead, Tayurskiy's aircraft entered a zone of dense antiaircraft fire. The fuel system was knocked out by a direct shell hit. Konstantin took fragments to the head. A black streamer of burning gasoline trailed behind the aircraft. The bomber might explode at any moment. The pilot did not turn back, however, but withdrew from the aircraft formation so that if it exploded it would not damage aircraft flying behind it. He headed for the target and dropped his bombs on enemy artillery positions. Then the bomber, its tanks empty, landed behind friendly lines.

During the years of the Great Patriotic War flight commander Gds Sr Lt K. Tayurskiy flew a total of 142 combat missions, of which 137 were bombing missions, and five reconnaissance sorties behind enemy lines. Aerial engagements with fascist fighters are beyond count. Party member Tayurskiy fought the enemy bravely, fearlessly, skillfully. For courage and heroism displayed in the performance of combat missions he was twice awarded the Order of the Red Banner, the Order of the Patriotic War, 1st Class, the Order of the Red Star, as well as many medals.

The rapid evolution of aircraft in the postwar period demanded solid engineering knowledge. And squadron deputy commander Guards Captain Tayurskiy enrolled in the engineering faculty at the Air Force Engineering Academy imeni N. Ye. Zhukovskiy. A wealth of combat experience and strong engineering training enabled him to become a test pilot on graduation from the academy. This was in 1953.

The new job required a high degree of professional competence and flawless flying technique, composure and tenacity, boldness and the capability to take a calculated risk for the sake of saving an expensive aircraft. Konstantin Dmitriyevich endeavored to utilize more extensively the knowledge he had acquired at the academy and prepared thoroughly on the ground for each test flight. Nevertheless the unexpected sometimes occurred. Occasionally he would have to land with engines out and partially jammed controls, damaged by the helicopter's rotor blade. But he never abandoned a test aircraft: he always bore in mind the enormous labor of design engineers and workers invested in it.

The automatic fuel system failed during government tests of an experimental heavy jet aircraft for maximum range. First one engine shut down, followed by the other. The aircraft, nosing down sharply, headed downward. Tayurskiy set up optimal airspeed for restart and, working together with the flight technician (as they had practiced on the ground), he proceeded to start up the engines alternately. They were quite close to the ground when both engines were restored to cruise power.

"On one test flight," Konstantin Dmitriyevich recalled, "we were to evaluate the lateral stability and controllability characteristics of the Yak-24 tandem-rotor helicopter. At that time it was nicknamed the "flying boxcar." At an altitude of 1,000 meters I was depressing the pedals step by step, to full pedal, at various prescribed speeds. The helicopter was maintained in level flight by the other controls. In a slip, however, it shook violently. During the next displacement forward, the pedal suddenly and unexpectedly "dropped out," that is, spontaneously went forward full travel. The helicopter gave a jerk and, tipping sideward, proceeded to descend while rotating in the direction opposite to the bank. He pushed opposite pedal with all his might -- to no avail. He attempted to assist with the cyclic and collective -- again to no avail. The helicopter was now entirely over on its side and, increasing its rate of descent, continued rotation. Finally he succeeded in selecting a combination of cyclic and collective whereby the pedals began to be effective. The helicopter gradually commenced recovery to straight and level flight. Following a detailed analysis of the flight recorder tapes, requisite changes were made in the control system.

Tayurskiy took part in scientific research activities aimed at determining the performance capabilities of the Mi-1 and Mi-4 helicopters in mountain terrain. Aircrew operating manuals were written on the basis of the results, containing nomograms which make it possible quickly to determine a helicopter's high-altitude takeoff and landing performance capabilities and to obtain the requisite information on mountain-terrain flying procedures. He also participated as senior test pilot in scientific research work aimed at determining the stability and controllability characteristics of a heavy aircraft, powered by four turbojet engines, at high angles of attack up to stall. His mentors on these flights were such ace test pilots as Heroes of the Soviet Union and Honored Test Pilots USSR S. Brotsev and Yu. Antipov.

In 1964 Konstantin Dmitriyevich Tayurskiy, for his many years of innovative work in the field of testing and investigation of new aircraft, was awarded the title Honored Test Pilot USSR. Three decorations for labor successes were added to the pilot's combat decorations.

This combat veteran considers participation in cosmonaut training activities in preparation for flying in conditions of weightlessness to be the summit of test-pilot skill. He first encountered this phenomenon during the war, when he was putting his Pe-2 into a steep dive. It is true that these were only brief instants of weightlessness. Beginning in 1960, however, Konstantin Dmitriyevich began seriously investigating the possibilities of creating conditions of weightlessness on a jet aircraft. He made 125 flights with a Tu-104 which was specially equipped for this purpose, creating a total of 646 weightlessness intervals representing a grand total of 4 hours and 36 minutes.

As we know, the duration of weightlessness depends in large measure on the degree of a pilot's degree of proficiency and lasts an average of about 20 seconds. Tayurskiy ran it up to 26 seconds. These flights required great courage and the ability to fly an aircraft with extreme precision under unusual conditions, when the slightest mistake or error could lead to a mishap situation.

Pilot-cosmonauts USSR A. Nikolayev, P. Popovich, V. Bykovskiy, A. Leonov, V. Komarov, V. Shatalov, G. Beregovoy, B. Volynov, A. Yeliseyev, V. Kubasov, Ye. Khrunov, G. Shonin, V. Gorbatko, and others underwent space-flight training in the flying laboratory's "weightlessness tank." The world's first cosmonaut, Yuriy Alekseyevich Gagarin, frequently went up with them as an instructor.

Pilot K. Tayurskiy devoted more than 20 years to test flying. During this time he made approximately 100 test flights on fixed-wing and rotary-wing aircraft of various modifications, mastered 65 different types of aircraft, and logged more than 4,000 hours.

Today Konstantin Dmitriyevich is enjoying a deserved rest. But he cannot sit idle long. This combat veteran and honored test pilot USSR takes part in military-patriotic activities and is sharing his wealth of experience with young aviators.

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LONG-RANGE PRACTICE ASSAULT AIRDROP FLOWN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) p 7

[Article by A. Frolov: "In the Vanguard"]

[Text] The flight was over. Behind them were thousands of kilometers of extremely difficult route. The crew of Military Pilot 2nd Class Capt V. Gerasimov had been assigned a difficult mission -- after a maximum-range flight, to drop behind "enemy" lines a paratrooper assault force into a drop zone of limited size. The hours-long flight in formation by military transport aircraft in instrument meteorological conditions had involved great mental and physical exertion. In spite of the difficulties, the pilots reached the target area precisely to the designated point and precisely on schedule. After executing a missile-evading maneuver, they made their run and dropped the men and combat equipment. The mission was accomplished in excellent fashion.

The crew headed by party member Capt V. Gerasimov was young: crew members averaged 24 years old. And the aircraft commander himself was also young -- he had recently celebrated his 27th birthday. This vanguard team has achieved notable success. These aviators have been cited repeatedly by senior-level commanders for their excellent results in training and job performance, and a red pentagonal "Unit Excellent Aircraft" emblem adorns the fuselage of their aircraft. A great deal of effort, persistence, and patience was required of party member V. Gerasimov in order to make the subunit a vanguard performer.

When he was a child, Vladimir would gaze at airplanes flying overhead and would think enviously about and marvel at the people flying these winged machines. He firmly resolved to become a military pilot after completing his 10-year schooling. Five years have gone by since Lt V. Gerasimov, having graduated from the Balashov Higher Military Aviation School for Pilots imeni Chief Mar Avn A. A. Novikov reported to his first duty assignment. During this time a great many significant events have taken place in the life of this young officer: he has become a party member, a military pilot 2nd class, and an aircraft commander. Capt V. Gerasimov has fully mastered modern aircraft equipment and diversified tactics. By his high degree of commander demandingness and solicitous concern for his men, he has earned their profound respect.

A great deal remains for young aircraft commander party member V. Gerasimov to do in order to reinforce and add to the successes achieved by his crew. There is no doubt, however, that this vanguard team will meet fully and with excellent quality the upgraded socialist pledges made for the new training year.

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FRUNZE'S CONTRIBUTIONS TO MILITARY AVIATION LISTED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 8-10

[Article, published under the heading "M. V. Frunze Birth Centennial," by Candidate of Historical Sciences and Docent Col V. Pinchuk: "From the Lenin Guard"]

[Text] From the very first days of establishment of the USSR Armed Forces the Communist Party and Soviet Government tirelessly concerned themselves with training command cadres of a grass-roots background, who were totally dedicated to the cause of socialism and capable of providing a high degree of fighting efficiency to the army of the world's first worker-peasant state. Mikhail Vasil'yevich Frunze was a most brilliant representative of the party and people, a faithful disciple and comrade-in-arms of V. I. Lenin, an eminent military theorist and proletarian military leader. He was the first to give the most complete definition of the concept of military doctrine of the state, a definition which essentially holds true today, made a large contribution toward the development of military science and the art of warfare, formulated and resolved many issues pertaining to training and indoctrination of Soviet Armed Forces personnel which subsequently were confirmed and further developed in the combat and political training of Soviet servicemen.

In his military-theoretical and practical activities M. V. Frunze devoted considerable attention to establishment and combat employment of the Red Air Force. He stressed time and again that the air force was the principal technical combat arm, which would play a major role on the battlefields of the future.

Present-day advances in Soviet military science and art of warfare have absorbed the entire preceding experience in organizational development of the USSR Armed Forces, at the headwaters of which stood distinguished party, government and military figure M. V. Frunze.

In the spring of 1919 the joint forces of domestic and foreign counterrevolution commenced aggressive combat operations against Red Army units. A difficult situation developed on the Eastern Front, especially on its southern half. The party Central Committee recognized the Eastern Front as the principal war front and concentrated main efforts on defeating Kolchak's army. By decision of the Central Committee, the front's Southern Group of Forces, consisting of four armies, was headed by M. V. Frunze. Taking over command, Mikhail Vasil'yevich undertook a thorough study of the situation and the state of friendly and enemy troops. As a result of comprehensive intelligence gathering and analysis of the obtained data, he made the decision to launch a drive into the flank and rear of Kolchak's main force grouping. The commanding general assigned to military aviation an important role in this operation. He gathered his air power together into a single powerful striking force and concentrated it on the main axis of advance.

The Red military pilots conducted aerial reconnaissance of the enemy's deep and immediate rear areas, hit the Kolchak forces on the battlefield and in the troop concentration area, and maintained communications between Red Army units. Aviators flew more than 100 sorties during the operation.

Frunze wrote in a report to the commanding general of the Eastern Front that during the Ufa Operation he had personally assigned missions to the air detachments of the Southern Group, which were concentrated at that location. The pilots, in spite of technical difficulties, successfully accomplished their assigned missions, and aircraft had proven quite beneficial in this operation. Further on in the report Mikhail Vasil'yevich proposed a number of measures aimed at improving combat employment of aircraft. In particular he maintained that in order to improve the combat efficiency of the aviation detachments they should be freed from independent conduct of the administrative responsibilities of a separate unit, and that they should be placed directly under the commanding generals of armies, proceeding from the proposition that military aviation is not only a reconnaissance agency but also a purely combat weapon.

On Frunze's recommendation, pilots I. Savin and A. Tomashevskiy of the 11th Air Detachment were awarded the Order of the Red Banner. The statement of nomination noted that these pilots, by their bold actions and well-aimed bombing, had sent the enemy into panic and had inflicted losses. It was emphasized that they had delivered effective machinegun fire while flying their aircraft at low level.

Directing for the first time the combat actions of the air forces of an army group, Mikhail Vasil'yevich correctly assessed their capabilities and function and investigated matters of tactics and organizational structure. All this enabled him effectively to utilize aviation in subsequent fighting.

An operation to break out of encirclement at Uralsk was successfully carried out under the direct supervision of M. V. Frunze. Here too the Red military pilots greatly assisted the ground troops, the Chapayev Division in particular. They regularly conducted reconnaissance, maintained communication between the besieged forces and the front's troops, and supplied the city with

medical supplies, provisions and ammunition. It is in large part thanks to the pilots' assistance that the beleaguered garrison successfully withstood a lengthy siege and valiantly repulsed all attempts by the White Guard to break through to the streets of the city.

On the whole the success of the Southern Group of Forces grew into a general counteroffensive by the entire front. Kolchak's armies were crushed as a result.

Soon Mikhail Vasil'yevich was given a new duty assignment -- as commander of the Turkestan Front. The Bukhara Operation was planned, to achieve the earliest possible liberation of the toilers of the Turkestan Soviet Republic from the rule of the emir. Formulating the missions of military aviation, M. V. Frunze stated: "...Extensively utilize air detachments as a combat squadron to bomb, machinegun, and pursue the enemy."

The combat activities of the Red military pilots were highly intensive during that period. Carrying out the instructions of the commanding general, they conducted aerial reconnaissance of the enemy's forces, flew several raids, in groups of 10-11 aircraft, on the emir's headquarters, and pursued his retreating troops. Pilots were flying several sorties each day. They dropped approximately 300 bombs onto the enemy, as well as appeals and leaflets.

In a commendation for the Turkestan Front M. V. Frunze highly praised the actions of the aviators, who made a substantial contribution toward crushing the last bulwark of counterrevolution in Central Asia. The air group's flight personnel were awarded the Order of the Red Banner and given prizes. Mikhail Vasil'yevich acquired additional experience in directing and utilizing air forces. This experience soon came in quite handy.

In the fall of 1920 the strategic situation became sharply aggravated in the southern part of the Soviet Republic, where Vrangel's forces, armed by the imperialists, were operating. By decision of the party Central Committee, Frunze was named commander of the Southern Front. The operations conducted by this front under his direction were also distinguished by boldness of concept, by skilled concentration of air power in the main sectors, and by ensuring close coordination of air forces with ground troops.

In combat with Vrangel's forces many Red pilots displayed great bravery, courage and heroism, as well as a high degree of skill. The crews of the Il'ya Muromets heavy bombers led by pilots N. Vasil'chenko and A. Tumanskiy particularly distinguished themselves. On one mission they bombed an enemy airfield and destroyed four of the six aircraft standing on the ground.

The front's Red military pilots flew a total of about 1,000 combat sorties and dropped more than 2,500 kilograms of bombs plus large quantities of leaflets. The front commander set the best aviators up as an example and recommended that the others learn from them.

Following the victorious conclusion of the Civil War, the Soviet people proceeded with peaceful building of socialism. It was accomplished in very difficult conditions. Many factories and plants were not operating. There

was a shortage of grain, fuel, and clothing. In addition, the imperialists had not abandoned their schemes of toppling Soviet rule, were planning new military ventures against the Soviet land, and were attempting to strangle it in the grip of an economic blockade. In these conditions the Communist Party and Soviet Government took measures to rebuild the economy and strengthen the nation's defense capability. In particular, an extensive aircraft construction program was prescribed.

The enemies of Soviet rule, both within the country and abroad, were persistently claiming that it was impossible to build socialism in the USSR and predicted the early demise of the Land of Soviets. Our plans to build an air force at a swift pace were characterized abroad as nothing but a Bolshevik pipe dream. In the West they were persistently asserting that the Russians would be unable to learn knowledgeably to operate and maintain complex aircraft. The bourgeois propaganda prophecies, however, were not fated to come to pass. The Communist Party advanced the slogan: "Toiling people, build an Air Force!", which became a motto for millions of toilers. The Society of Friends of the Air Force (ODVF) was established in 1923, and a society Central Council was elected. The council membership included M. V. Frunze, who at the same time served as deputy chairman of the Aviation and Lighter-Than-Air Aeronautics Association of the Ukraine and the Crimea (OAVUK).

Of great importance for determining the principal areas and directions of the society's activities was the joint session of the ODVF Central Council with the delegates to the 12th Congress of the Russian Communist Party (of Bolsheviks), held in April 1923. The discussion agenda at this meeting included specific matters pertaining to party guidance of the national undertaking to establish a Red Air Force. M. V. Frunze, commander of forces of the Ukraine and the Crimea, gave a substantial address at the meeting. He urged society members to speed up organizational development of the Soviet Union's air forces, so that our country need fear no military threat from any quarter. He not only appealed for action but himself gave an example of active work in this direction.

Thanks to constant attention by Mikhail Vasil'yevich, OAVUK extensively engaged in its activities, encompassed many areas of the country, and gave substantial assistance to the Air Force.

M. V. Frunze's talent as an outstanding military leader and organizer blossomed in the position of deputy chairman and, from January 1925, chairman of the Republic Revolutionary Military Council and people's commissar for military and naval affairs. Turning to air-force leaders at that time, Mikhail Vasil'yevich assigned them the following task: "Bring every influence to bear on the aircraft industry to ensure that it furnishes us with large numbers of modern aircraft of the finest quality. I shall not be at peace until such time as we possess a strong air force. I shall demand determined actions and correction of all problems." A three-year development plan for the Red Air Force, covering the period 1924-1926, was drawn up with Frunze's direct participation. Its implementation proceeded successfully, and in June 1925 the Presidium of the USSR Revolutionary Military Council adopted a decision to revise the previous aircraft building target, boosting production by 50 percent.

A gifted military commander, leader and organizer, a Communist of Leninist toughness, M. V. Frunze well understood the fact that no matter how sophisticated hardware may be, behind it there always stands a living person, without whom this equipment is lifeless. Therefore the matter of training aviation cadres remained the most important agenda item for him. For example, he devoted considerable attention to the activities of the Air Force Academy imeni Professor M. Ye. Zhukovskiy. Mikhail Vasil'yevich took a lively interest in how the curricular process was being organized and improved, how scientific and practical activities were proceeding, and what effectiveness they were having. He placed high hopes on the academy's students.

The first class of aviation engineers who had completed the full course of study at the academy graduated in April 1925. By order of the USSR RMC, the aviation specialists were conferred the rank of "Air Force mechanical engineer." "Your class represents a major success in the difficult business of developing Soviet hardware," stated M. V. Frunze in his message of greeting. "...The Red Air Force needs an entire army of construction engineers, machine builders and technicians fully armed with modern scientific knowledge. The Air Force Academy, which today has marked the beginning, in the future must help fully accomplish this task. This constitutes a guarantee of the future might of the Soviet Air Force, which is being born before our eyes."

Well-trained, gifted specialists who were totally dedicated to the cause entered military aviation. Their enthusiasm and high degree of vigorous innovativeness had an immediate effect on solving the major problems of organizational development of the Red Air Force. The country's first flight for purposes of scientific research took place in 1925 with Mikhail Vasil'yevich's knowledge and approval -- a test of Soviet-built air navigation instruments. A 300-horsepower aircraft engine entirely manufactured of Soviet materials was tested and put into regular production at that same time. The two-seater all-metal ANT-3 aircraft designed by A. N. Tupolev (a reconnaissance aircraft in the military version) commenced flight testing, and the ANT-4, known in the Air Forces as the TB-1, was being readied for flight testing. Other aircraft designs, engines, instruments, and weapon systems were also being examined. Preparations were being made for flights from Moscow to Peking and Leningrad to Matochkin Shar, which were made that same year.

This constitutes a major success for the world's first socialist state. Addressing the Third Congress of USSR Soviets with a report entitled "The Red Army and Defense of the Soviet Union," M. V. Frunze reported with great pride in our homeland that the Soviet aircraft industry was developing at a rapid pace and was meeting the country's requirements to an increasingly larger degree. "Our aviation," he stressed, "is commencing to enter the world arena."

Mikhail Vasil'yevich attached particular importance to training flight personnel for the Red Air Force, assigning a substantial role to youth. "It would be a very good thing to enlist our young people to organic work pertaining to the development of Soviet aviation," he wrote, "for the purpose

of acquisition of technical skills and mass training of flight personnel. This could be done most conveniently in the form of Komsomol patronship not only over the navy but the air force as well. Unquestionably proletarian youth, with its enthusiasm and energy, will be able to give an enormous impetus to the development of aviation and will help transform it from the activity of a narrow group of specialists to a nationwide undertaking."

Thus at a most important stage in the emergence of Soviet aviation, M. V. Frunze perspicaciously defined the principal source of flight and technical cadres. His ideas and suggestions on this matter were reflected in a resolution of the Ninth All-Union Komsomol Congress, which proclaimed the following fighting slogan: "Komsomol member, to the aircraft!" As a result, by the beginning of the Great Patriotic War almost one out of every three aviators was a Komsomol member.

The endeavor to grasp all of the finer points of military affairs and to have his own opinion on a number of major problems pertaining to military theory and practice was an inner need of Mikhail Vasil'yevich, an expression of his high level of intellectual awareness and innovative approach to solving practical problems. Examining matters pertaining to Air Forces organization and combat training, Frunze displayed a high degree of awareness, knowledgeability, and foresight. The character of army and strategic aviation, the character and role of naval aviation in the overall organizational development of the USSR Air Force, the significance of a highly-developed aircraft industry and scientific research activities, matters of combat employment, etc were determined with his direct participation and guidance. His activities, directed toward the establishment and strengthening of Soviet aviation, produced outstanding results. Party and government, the entire Soviet people, and the men of the Armed Forces gave him high marks. Giving due credit to this outstanding individual, Red Army Air Forces chief P. Baranov wrote in the fall of 1925, following the death of Mikhail Vasil'yevich, that the Red Air Force in its current organization was the offspring of Frunze.

The principal theoretical points applying to Soviet military science and the art of warfare advanced and elaborated by M. V. Frunze received confirmation during the Great Patriotic War. Our Air Forces -- the most mobile and longest-range branch of the Armed Forces -- exerted considerable influence on the course and outcome not only of individual operations but also of the war as a whole. Educated by the Leninist Party and Komsomol, Soviet combat pilots displayed the highest degree of skill as well as outstanding feats of courage and heroism. Soviet industry gave them sophisticated hardware, which became a genuine instrument of victory. The CPSU Central Committee decree entitled "On the 40th Anniversary of Victory by the Soviet People in the Great Patriotic War, 1941-1945" stresses that the entire course of the intense struggle demonstrated the superiority of Soviet military science and the high level of strategic leadership and combat expertise of our military cadres, including aviation cadres.

Thus practical experience has convincingly confirmed faithfulness to the Communist Party line and the ideas of V. I. Lenin and his comrade in arms M.

V. Frunze in the area of organizational development of the USSR Armed Forces and strengthening the defense of the socialist homeland.

Today as well the Soviet Air Forces, furnished with everything needed to repulse an aggressor, are vigilantly standing guard over the achievements of socialism.

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Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 10-11

[Article, published under the heading "Implementing the Decisions of the 26th CPSU Congress," by Maj Gen A. Mamayev, member of the Presidium of USSR DOSAAF Central Committee: "DOSAAF Gives Wings"]

[Text] The years which have passed since the 26th CPSU Congress have been marked by inspired labor by the Soviet people, directed toward implementation of the grandiose plans of building communism in our country. During this period, in view of the fact that the international situation has become aggravated through the fault of aggressive imperialist circles, the party and government have constantly devoted unabating attention to matters pertaining to strengthening the defense capability of the Soviet State and the USSR Armed Forces.

It was noted at the highest forum of Communists that their combat potential comprises a strong fusion of sophisticated technical equipment, military expertise, and indomitable morale. The activities of the All-Union Order of Lenin and Order of the Red Banner Voluntary Society for Assistance to the Army, Air Force, and Navy -- USSR DOSAAF -- are directed toward strengthening this combat potential and toward preparing and training the toilers for defense of the socialist homeland. DOSAAF is rightfully called a school of patriots, a reliable reserve for the Soviet Armed Forces.

The work of the defense Society takes on particular significance in light of the requirements of the CPSU Central Committee decree entitled "On Further Improving Party Guidance of Komsomol and Enhancement of Its Role in Communist Indoctrination of Youth." It emphasizes that the defense Society should step up military-patriotic indoctrination of the younger Soviet generation and instill in them a strong feeling of responsibility for carrying out one's honorable duty to defend the socialist homeland. Carrying out the demands of the party, DOSAAF organizations see their task in working with even greater

persistence to instill in young people love for the homeland and hatred toward its enemies, a high degree of political vigilance and continuous readiness and willingness to perform heroic exploits.

Taking active part in implementing the decisions of the 26th CPSU Congress, subsequent Central Committee plenums, and the instructions of CPSU Central Committee General Secretary Comrade K. U. Chernenko, chairman of the Presidium of the USSR Supreme Soviet, the defense Society is growing in membership and becoming stronger organizationally. Its 358,000 primary organizations, operating in the majority of workforces and student bodies, represent a total membership in excess of 105 million.

The defense Society is successfully carrying out its tasks pertaining to military-patriotic indoctrination of toilers, preparing young people for service in the ranks of the USSR Armed Forces, dissemination of military-technical knowledge, and is ideologically and physically conditioning the future defenders of the socialist homeland.

DOSAAF trains for the nation's economy cadres of mass technical occupations which are of applied military significance. Last year alone more than 2.1 million specialists of various areas of specialization were trained at DOSAAF schools, clubs, and in various training courses, persons who today are worthily making a contribution toward achieving the economic targets of the 11th Five-Year Plan and who tomorrow, if the need arises, will confidently join the ranks of technically trained and prepared defenders of the homeland.

An important directional thrust in DOSAAF activities is guidance of development of the technical and applied military sports in this country. Aviation sport enjoys great popularity.

Performing its basic mission of actively assisting in strengthening our country's defense capability and in training and preparing young people to defend the socialist homeland, DOSAAF is actively taking part in development of Soviet aviation and in training and indoctrinating those who constitute its pride and joy. This work dates back to the distant 1920's. In March 1923 the enthusiasm of Soviet citizens, evoked by the party's appeal "Working People, Build an Air Force!", resulted in the creation of a mass volunteer organization of toilers -- the Society of Friends of the Air Force -- ODVF. It marked the beginning of the development of aviation sports in this country, particularly soaring.

Broad response was evoked by the appeal issued by the Society of Friends of the Air Force: "From model to glider, from glider to airplane." Within a short period of time approximately 150 combat aircraft were built with funds contributed by the general public. In January 1925 ODVF handed over to the Air Force the Air Squadron imeni V. I. Lenin. Subsequently the Air Squadron imeni F. E. Dzerzhinskiy and several air detachments were formed.

The Society was growing, becoming stronger, and performing an increasingly broader range of tasks. Its name was also changing in conformity with this. As a result a unified organization was formed in 1927 for the purpose of

accomplishing more successful work: the Union of Societies of Friends of Defense, Aviation and the Chemical Industry USSR (abbreviated to Osoaviakhim). All major activities conducted in this country in the prewar and war years were linked to its patriotic activities.

The number of flying clubs had increased to 170 by 1936, while the aircraft fleet had grown almost 12-fold. The number of pilots trained by the defense Society was also growing. From 1930 to 1941 flying clubs trained more than 120,000 pilots and almost as many parachutists.

The Soviet combat pilots who took to the air early in the morning on 22 June 1941 to repulse the first fascist air attacks included former pupils of the defense Society.

The homeland greatly appreciated the exploits of its winged defenders. The pilots awarded the title Hero of the Soviet Union during the Great Patriotic War included approximately 1,000 alumni of Osoaviakhim.

Work pertaining to teaching flying to those drawn toward the heavens assumed a new scale and scope in DOSAAF (the defense Society adopted this name in 1951) in the postwar years. Many future cosmonauts joined flying clubs during this time. Yu. A. Gagarin, the first man in space, stressed time and again that he had begun his journey to space with the Saratov Flying Club. Intelligent and solicitous teachers had instilled in him a love of aviation and had helped him find his true calling.

Many persons of Yuriy Gagarin's age -- pilots of the postwar era -- were greatly helped by the fact that famed combat pilots, heroes of the last war, became their flying club mentors. These include Hero of the Soviet Union and Honored Military Pilot USSR Col Gen Avn S. Kharlamov, Hero of the Soviet Union A. Trud, I. Kuznetsov, I. Sereda, I. Vishnyakov, and others. They not only were passing on and are passing on their professional knowledge to youth but are also instilling in them patriotism, readiness and willingness to accomplish exploits for the sake of the homeland. Many of their pupils have achieved great heights and have accomplished feats for the homeland. Lt Col V. Shcherbakov, for example, graduated from the Vitebsk DOSAAF Flying Club. He later graduated from service school and served in helicopter units. He was awarded the title Hero of the Soviet Union for exemplary performance of military duty and valor, courage and skill displayed thereby.

A high degree of flying skill, a total effort, discipline, and persistence in achieving the stated objective characterize Military Pilot 1st Class Lt Col Yu. Churilov. He started flying with the Voronezh DOSAAF Flying Club. He also was awarded the title Hero of the Soviet Union for excellent performance results in mastering new equipment, for courage and heroism.

Hero of the Soviet Union, Pilot-Cosmonaut USSR, and Honored Test Pilot USSR I. Volk gained his wings in the Kursk DOSAAF Flying Club and set aim for cosmonaut service.

DOSAAF is also rightly proud of one of its alumnae -- twice Hero of the Soviet Union S. Savitskaya, the first woman to fly two manned space missions and the first woman to take a space walk.

Today as well DOSAAF flying clubs and aviation sports clubs are helping the most courageous and purposeful young people find their career choice, their path to the skies. Eager to learn to fly, they join DOSAAF in order to accomplish this dream.

The Chelyabinsk DOSAAF Flying Club has been training young people to fly jet aircraft for about 20 years now. Many of its pupils have won various competitions and have become masters of sport and military pilots. Former flying club student Yu. Kiselev, for example, is now a military pilot 1st class and expert at advanced maneuvers. He hits air and ground targets with equal precision.

The Vladimir Flying Club has been successfully training helicopter pilots for many years now. Many of its graduates are serving in the Air Forces and are carrying out with honor their patriotic and internationalist duty. And such DOSAAF alumni as USSR Master of Sport International Class A. Poletayev are teaching young people to fly and to win in sports competitions.

An important role in preparing young people for military service is played by the aviation sports, which are just the thing for persons who are strong in spirit and body, brave and courageous. DOSAAF flying clubs are working steadily to convey knowledge of aviation to the masses, are endeavoring to enlist young people to become involved in the aviation sports, and are organizing practical training of sport pilots, glider pilots, and parachutists. Training classes and indoctrination work are as a rule conducted in the flying clubs by instructors who in the past served in the Air Forces. Under the influence of their thoughtful and purposeful activity conducted in workforces and among youth enrolled in school, many young people choose a career in aviation.

The Barnaul, Donetsk, Kuybyshev, Rostov, Vitebsk, and other flying clubs are skillfully getting young people involved in the aviation sports. In the Barnaul Flying Club, for example, instructors frequently visit factories, general-curriculum schools and vocational schools. Honored Master of Sports L. Yeremina, in particular, maintains close contacts with preinduction youth. She arranges for talks to be given in that city by top aviation sportspeople, aggressively enlists young people to club training activities, and has given initial aviation training to several dozen boys and girls.

This flying club's officials and leading sportspeople extensively utilize local radio and television to publicize the aviation sports. Recently they held a publicity flying tour of Altai Kray, during which they aggressively publicized the fighting traditions of the Air Forces, service in the Air Forces, and told of deeds by Soviet pilots during the war years and in peacetime. As a result sports groups and sections were established in seven of the kray's rayons. In honor of the 40th anniversary of the victory of the Soviet people in the Great Patriotic War, the club is holding sports competitions for the Cup imeni Twice Hero of the Soviet Union P. Plotnikov.

Those DOSAAF organizations which have achieved the best results in training sports competitors and aviation specialists for the USSR Armed Forces have been given prestigious awards -- challenge Red Banners. Recipients include the Rostov Flying Club, headed by A. Rassunovskiy, and the Krasnodar Aviation Sports Club, headed by N. Maslov. The students of these clubs have successfully passed final examinations. All of them are Prepared for Labor and Defense badgeholders and have obtained good physical conditioning. Last year many of them enrolled in aviation and other service schools.

In recent years, especially at the present time, since issuing of the CPSU Central Committee decree entitled "On Principal Directions of the General-Curriculum and Vocational School Reform," flying clubs have established closer ties with primary DOSAAF organizations and are giving them more specific assistance in the conduct of mass defense activities. The Kuybyshev Flying Club imeni Hero of the Soviet Union Fighter Pilot V. Fadeyev, for example, is improving its work with school DOSAAF organizations. Results are in evidence. An interschool training and production combine of aerospace specialization is operating in this city. In this combine upper graders study the design and construction of aircraft, aircraft engines, and parachute-jump. Many classes are conducted by flying club instructors, former military pilots, combat and Air Forces veterans. Young people not only become acquainted with aviation, a career with romance, and receive good physical conditioning, but also develop a sense of responsibility, confidence in their own ability, and receive schooling in patriotism. This is producing substantial results. Last year alone more than half of the graduates of this training-production combine enrolled in military aviation schools and are serving in aviation and airborne units. And according to their commanding officers, the majority are displaying an example in training and discipline.

As was noted at the 9th All-Union DOSAAF Congress, the defense Society is for the most part successfully accomplishing its assigned tasks. At the same time, however, one must note certain deficiencies in mass defense work, including in the area of dissemination of aviation knowledge and teaching flying to young people. Working to correct these deficiencies, DOSAAF committees are seeking to honor the 27th CPSU Congress with new achievements. Carrying out the demands of the CPSU Central Committee decree entitled "On the 40th Anniversary of Victory by the Soviet People in the Great Patriotic War, 1941-1945," they are improving the forms of their activity aimed at indoctrinating toilers in a spirit of Soviet patriotism and socialist internationalism, a conscientious attitude toward labor to increase our homeland's economic and defense might, and continuous readiness and willingness to defend it.

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CSO: 9144/234

YOUNG AF OFFICERS NEED HELP MAINTAINING FAMILY HARMONY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 14-15

[Article, published under the heading "The Reader Continues the Discussion," by Gds Lt Col Ye. Revko, unit party committee secretary: "They Need Care and Attention"]

[Text] Discussion on the pages of this journal of problems pertaining to the influence of family relationships on an officer's flying and military duties struck a responsive chord in our garrison's aviation personnel, and not only because the family, whose members are linked by a community of domestic life, mutual moral responsibility and mutual assistance, is a microcosm of our socialist society. The aviator-officer's family is a special union in which the bonds should be strong, suitable to the character of persons who have dedicated themselves to serving the homeland in such a courageous and heroic branch of the Armed Forces as military aviation. We are by no means indifferent to the question of whether peace or harmony reign in the family or discord and quarrels, which hinder the serviceman from honestly and conscientiously carrying out his constitutional duty.

The nature of family relationships depends in large measure on the officer himself and his spouse. It is my deep conviction, however, that the command authorities, political agencies, and public organizations are also obliged to do a great deal in order to ensure that the family becomes a solid, reliable "home front" for the aviator.

I recall when I was just breaking in as a lieutenant, in a distant aviation garrison in the Transcaucasus, to which several of us young officers were assigned upon graduating from military aviation school. It did not take us very long to break in, although things were difficult at first. We returned fatigued from flight operations, but we knew that we were impatiently awaited at home.

Was everything going right with us? Unfortunately, no. Some problems with housing and living conditions, difficulties with supply, and the unaccustomed life of a military post with its written and unwritten rules and regulations -- all this made an imprint on our work and involved considerable emotional stress. To this was added concern on the part of our spouses, the majority of

whom possessed specialized education but unfortunately could not find employment. Some of them began considering the possibility of going home to their parents "until things got better." This injected nervousness and irritability into relationships and did not have a positive effect on performance of an officer's duties.

Inestimable assistance to young families was given by the unit women's council, headed by aviation squadron commander's wife G. Polukhina. All of us were frequent guests in the squadron commander's home. It is hard to say what was the strongest attraction in drawing us there: respect for the commanding officer or the atmosphere of kindness, warmth and comfort created by the lady of the house. Ever calm, composed, and attentive, she had the ability to listen to a person with genuine interest, to give advice and help. The squadron commander's family included two daughters, but Galina managed to find time to engage in volunteer work as well as in amateur talent activities. The relationship between these people was a model for us, as it were, against which we gauged our own family life. Our wives took an example from Galina Polukhina. Many of them found a way to apply their talents with her help. T. Pinchukova and Z. Pukhova, for example, began taking active part in the activities of the women's council.

One specific feature of a remote aviation garrison is the fact that there are few places for aviation personnel and members of their families to socialize: officers' club, canteen, library. For this reason solicitous concern by command personnel, political workers, and the women's council regarding organization and conduct of leisure-time activities is very important. The people at the garrison would look forward impatiently, for example, to general meetings of the wives of military personnel, and amateur performances in which L. Rybina, A. Storozhuk, G. Khadzugova, and others took part. And as a rule people's expectations were met, with a boost to garrison morale.

An atmosphere of mutual respect, warmth and affection at home and a healthy moral climate in the garrison greatly helped the lieutenants "spread their wings." Officers A. Sapon, N. Shestakov, B. Khadzugov, N. Sukharev and others became military pilots 1st class long ago, but they still remember their first mentors, while their wives remember the lessons in kindness and sensitivity taught them by the wives of senior personnel.

A great deal has changed in the intervening years. There has occurred a rise in the general educational and cultural level of officers and the members of their families, and housing and living conditions have improved. There continue to be quite a few problems, however.

Every pilot's wife is uneasy when her husband is flying. Of course the cause which her officer husband serves is of paramount importance for the genuine military wife, just as it has been in the past. She too, however, does not want to sit around idle but seeks to make her contribution to the people's labor, to apply the knowledge she has acquired at college, secondary technical school or training school. But while an officer, when he arrives at a new duty assignment, begins work on the following day, his wife frequently has problems obtaining employment. Nor is the housing problem resolved immediately.

Comparing today's life in the collective with the life at a remote garrison and assessing relationships in the families of aviation personnel and the work of the women's council, one reaches the conclusion that there remains a good deal with which we can be dissatisfied. It is true that there are objective reasons for this. Aviation personnel reside in different parts of town and the members of their families are busy at work, and therefore it is no easy matter to hold a general meeting of the wives of military personnel. We periodically hold meetings of the wives of unit military personnel, but unfortunately no more than half of the wives attend. On the other hand, in a new garrison there are more opportunities for meaningful leisure-time activities. An amateur performance can be organized, but a question arises: will people attend?

The women's council has done many useful things. New Year's Eve dances are held at its initiative, Christmas [New Year's] trees are set up and trimmed for the children, and other interesting activities are conducted. A great deal remains to be done, however. And the women's council is capable of handling the job, particularly since it contains such active, vigorous individuals as servicemen's wives T. Pridannikova, T. Zhigalina, and A. Ivanova. Unfortunately the members of this elected body sometimes work in the old way, without considering the needs of the young officers. Why do they not have activities specifically for this category of military personnel? A good deal of thought should be given to the question of what should be done to improve work with young officers and the members of their families and how to instill in young people a striving toward self-education and intelligent utilization of free time. It is no secret that many young officers are unable to utilize their free time correctly.

It is very unfortunate that not all young married couples succeed in making things work out. Sometimes a union of two loving individuals comes apart. Husband, wife, family -- these, to quote Engels, are titles which involve quite definite, very serious obligations. Unfortunately not everybody is able to handle them.

Recently a young officer came to me.

"I am getting divorced," he stated. "My wife has already gone home to her parents. One thing I can't understand: why am I being summoned to a meeting of the subunit party buro? I am doing my job without any problems. And discord in the family is my own personal business."

There were in fact no complaints about this young officer's job performance. I also knew about his family problems. I had spoken with him about them on several occasions. His wife was primarily to blame for the disharmony. But he also shared considerable blame. He did not always help her and did not take the trouble to inquire what was bothering her, what was on her mind. And yet it is primarily the husband who should support his wife and keep her spirits up.

This officer was too late in becoming aware of his responsibility for strengthening family bonds and did not fully understand that he was summoned

to a meeting of the subunit party buro because the Communists were interested in his fate and wanted to help him.

The family of a young officer.... It needs particular concern and attention on the part of those standing alongside, whose duty of office obliges them to do everything possible to improve the family's moral and ethical atmosphere, helping ensure that the young aviator devotes all his energies to the cause of increasing his flying skills and strengthening the subunit's combat readiness.

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CSO: 9144/234

U.S. CHARGED WITH VICIOUS PSYWAR CAMPAIGN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 18-19

[Article, published under the heading "At the Fronts of the Ideological Struggle," by V. Taydakov, scientific worker, USSR Academy of Sciences Institute of Sociological Research: "Psychological Warfare 'Crusaders'"]

[Text] In the spring of 1951 A. Dulles, at that time head of U.S. intelligence, was lecturing a British colleague: "We need to step up the ideological campaign against the Soviets, ideological sabotage, if you will.... How is this done? Fairly simply: a little bit of ink, a great many old files, a group of pen pushers, and a certain amount of dollars."

The proposed "method" is guiding his successors to this very day. Imperialist propaganda in its present-day form -- this "alliance of lies," as V. I. Lenin aptly put it, is endeavoring with all its might on the one hand to slander the peace-seeking policy of the Soviet Union and the other nations of the socialist community, and on the other hand to justify the militarist policy of the present U.S. Administration in office.

Comrade K. U. Chernenko noted at the June (1983) CPSU Central Committee Plenum that imperialism, particularly U.S. imperialism, having suffered a number of major defeats in the world arena in the 1960's and 1970's, is launching increasingly more massive attacks, unprecedented in scale, against our societal system and Marxist-Leninist ideology, and is endeavoring to poison the consciousness of Soviet citizens, to distort our foreign policy aims, and to block the growing influence of genuine socialism -- the main bulwark of the cause of peace and freedom of peoples. U.S. imperialism is indeed stopping at nothing in its attempt to force its will on others.

Genuine and Imaginary Terrorism

U.S. imperialism and its Western flunkies, realizing that the USSR and the other nations of the socialist community, which possess an adequacy of defense

might, constitute the main obstacle in the path of their hegemonistic aspirations, are utilizing the foulest means and devices in the struggle against genuine socialism. The present White House Administration has struck a course toward sharp aggravation of relations between the United States and the Soviet Union and is high-handedly ignoring previously-adopted Soviet-American agreements. Statements made by U.S. political and military leaders contain threats leveled at our country and acknowledge the possibility of launching a preemptive nuclear strike against strategically important installations on the territory of the USSR.

Whom does the White House consider to be terrorists? Naturally not those who invaded and occupied Grenada, those who are giving every kind of support to Israel, which invaded Lebanon, nor those who are sending bands of mercenaries into Nicaragua. Terrorism is ascribed to peoples which are fighting for their social and national liberation, against imperialist oppression. In the opinion of the psychological warfare "crusaders," they are all terrorists -- the peoples of Angola, Nicaragua, and other countries which have taken the path of struggle for their freedom and independence.

And yet the bearers of the American model of "freedom and democracy" have for many years now been organizing acts of sabotage against socialist Cuba, have been waging an undeclared war against democratic Afghanistan, have been supporting gangs laying claim to power in Kampuchea, and are "supporting" on their bayonets bloody regimes in Chile and El Salvador. The list of actions of this kind goes on and on. In carrying them out, the present U.S. Administration is attempting to halt national liberation movements and to impede progressive reforms in the countries of Latin America, Asia, and Africa. In carrying out these actions, the U.S. imperialists hide behind noisy demagogic slogans about a "Soviet threat," the "hand of Moscow," etc.

Such devices by the "crusaders" of psychological warfare attest to the fact that it is becoming increasingly more difficult for bourgeois politicians and the propaganda machine they direct to conceal from the peoples of their own countries the indisputable achievements of genuine socialism and the attractive force of socialist ideas.

Under the Slogans of "Neanderthal" Anticommunism

Addressing the British Parliament, the U.S. President declared that he would do everything in his power to leave Marxism-Leninism "on the ash heap of history." Is Mr Reagan not too self-confident? In the last 67 years, ever since it took over power, the Soviet people has heard similar boastful declarations time and again. Everybody knows how they ended. Today's claimants to the title "rules of the world" are obviously out of step with history. Seized by a spirit of "Neanderthal" anticommunism, they are once again setting out on a "crusade" against our country and the other nations of the socialist community.

The misanthropic strategy of anti-Sovietism and anticommunism is being deployed in many directions. We are dealing with psychological warfare, including political and material support of counterrevolutionary acts of sabotage against the socialist countries; we are dealing with economic

warfare, curtailment of trade and credit relations, and "economic exhaustion" of the socialist countries by pushing the arms race involving the latest and most advanced weapons; we are also dealing with a policy aimed at achieving U.S. military-strategic superiority over the USSR and NATO superiority over the Warsaw Pact.

The advocates of psychological warfare are seeking to substitute for the clash of ideas undisguised slander and disinformation, a savage assault on progressive views and the aggressive fanning of hatred toward progressive and revolutionary forces. In the United States and certain other Western countries anti-Soviet and antisocialist propaganda has been elevated to the status of government policy.

Governmental and intergovernmental centers for planning and coordination of ideological sabotage activities today comprise the structure of the psychological warfare edifice. Within the framework of NATO, for example, the committee on information and cultural relations and the association of the North Atlantic Alliance, which claims to be a spokesman for public opinion and which maintains branches in all NATO member nations, and the North Atlantic Assembly, which constitutes a forum of parliamentarians of these countries supporting the policy of the aggressive bloc, are utilized for the conduct and coordination of propaganda against the socialist countries. Also included in this category are research establishments, which formulate the ideological doctrines and plans which comprise the basic content of acts of ideological sabotage, as well as "Kremlinology" centers and "brain" trusts specializing in anticommunism and anti-Sovietism.

Such nongovernmental anticommunist organizations as the "Anti-Bolshevik Bloc of Peoples," the "European Freedom Alliance," the "World Anticommunist League," and others are engaged in ideological subversion activities. The "Popular Labor Alliance" (NTS) and anti-Soviet emigre organizations of Ukrainian, Baltic, and Transcaucasian bourgeois nationalists work in unison with them, launching attacks against the USSR and genuine socialism. Approximately 200 such organizations and intelligence services have set up shop in Munich alone.

The structure of the psychological warfare edifice includes reactionary religious centers, Zionist organizations, and the intelligence services of the imperialist countries, the main role among which is played by the U.S. Central Intelligence Agency. It is the instigator and principal organizer of all the most extensive and sophisticated subversive ideological actions.

On What Is the "Red Hysteria" Grounded?

Many facts indicate that there is nothing sacred to the U.S. politician-intriguers who have unleashed psychological warfare. They are prepared to go to any lengths for the sake of their narrow class aims. The Pentagon "public affairs" component alone puts out each year as many as 8 million copies of anti-Soviet books and pamphlets, hundreds of films, and produces more than 3,000 radio programs.

The arsenal of the anticomunists also contains other foul methods. For example, forged letters, provocational leaflets, records and tapes, on which are recorded in place of the indicated works of music vicious anti-Soviet, anticomunist statements, as well as various rumors with the aid of which, seeking to exploit existing shortcomings or difficulties, the psychological warfare "crusaders" attempt to evoke resentment on the part of the population, to discredit governmental or public organizations and individuals, and to undermine trust in their superiors on the part of the personnel of military units. This entire concoction is organized on a "scientific" basis and is encouraged by U.S. and NATO official circles.

Here is a small example of the techniques with the aid of which people in the West are brainwashed. There is a map of the world on the movie screen. The red color which covers the territory of the Soviet Union proceeds to pulsate, first spilling over Scandinavia, then inundating all of Western Europe, and finally the British Isles as well. A commentator's voice stuns the viewer with a "horrifying" prospect: if the NATO countries, including Great Britain, reject the nuclear strategy which has been devised for them, and especially refuse to permit deployment on their soil of the new U.S. medium-range missiles, a single fate awaits them -- transformation into "helpless satellites of Moscow." The scenes of this fabricated propaganda film, produced by Britain's Central Information Office on order for the Defense Ministry and intended to be shown at schools, in churches and other public places, were selected and commentary provided to further the claim that peace and security on the European Continent have been preserved only thanks to the NATO "nuclear shield," which counters the "aggressive aspirations" of the Soviet Union and its Warsaw Pact allies.

Psychological warfare against our country is no recent phenomenon. U.S. political commentators W. Lippmann and C. Mertz stated in an article entitled "Red Hysteria," written in 1920, that "the entire hysterical, the entire endless and complex intolerance of our day is grounded on a principal lie -- a lie about Russia." As we see, these words apply today as well.

In the United States and other NATO countries a mighty propaganda edifice, taking part in a Reagan-proclaimed "crusade" against the USSR and the other socialist countries, is loudly rehashing the big lie about a "Soviet threat." And in the meantime the conveyer belt of military production in the United States is moving full steam ahead. U.S. military expenditures in 1985 are to exceed 330 billion dollars. The thought of unleashing a thermonuclear war is justified on a wave of "red hysteria." NATO, and particularly U.S. military-political strategists enjoy the thought of the possibility of controlling and winning a thermonuclear war. They argue thereby that war per se is a calamity, but its scale will depend on what preparatory measures have been taken in foreseeing it, how it was initiated, and how it is waged.

History attests to the fact that a reactionary idea inculcated into the consciousness of the masses becomes a material force. The "crusaders" of ideological warfare are counting precisely on this. By means of ideological brainwashing of their own people, political and economic blackmail of their allies, lies and slander, they are endeavoring to continue escalating the arms race, to intensify confrontation between countries with different systems of

government and on this basis to achieve first and foremost their own hegemonist aspirations.

All this compels us to step up our political and military vigilance. "The present situation," noted CPSU Central Committee General Secretary Comrade K. U. Chernenko at the April (1984) CPSU Central Committee Plenum, "demands of us constant and comprehensive efforts to ensure this country's security and reliable defense of the peaceful labor of Soviet citizens."

Psychological warfare presents a considerable threat to the cause of peace and the fate of mankind, and it should not be underrated. The shifting of ideological conflicts into the realm of intergovernmental relations has never benefited anybody who has resorted to this.

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CSO: 9144/234

BOOK EXPOSES U.S. 'BIG LIE' CAMPAIGN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) p 19

[Article, published under the heading "Assisting the Propagandist," by Col (Ret) N. Kon'kov: "Strategy of the 'Big Lie'"]

[Text] Imperialist reaction has unleashed massive psychological warfare against the Soviet Union and the other nations of the socialist community. This war is being waged continuously, on a large scale, purposefully, in a sophisticated manner, utilizing the latest and most advanced technical devices, the foulest and most insidious methods. Hundreds of millions of dollars are spent on it each year. A great many ideological centers, thousands of specialists and scientists devise its strategy and tactics. One can read in greater detail on this subject in a book by V. Artemov (V. L. Artemov, "Psikhologicheskaya voyna v strategii imperializma" [Psychological Warfare in the Strategy of Imperialism] (Imperialism: Events, Facts, Documents), Moscow, Mezhdunarodnyye Otnosheniya, 1983, 144 pages, 25 kopecks).

The author defines the term "psychological warfare" proper as a system of actions connected with continuous, comprehensive, coordinated, and purposeful utilization of diversified means (from propaganda, economic, diplomatic, and other pressure to intelligence gathering, subversive actions and military operations), capable of exerting psychological influence on the adversary, forcing him to undertake steps beneficial to its organizers. It is a logical product of the crisis of bourgeois ideology. The objective of psychological warfare in the final analysis is to shake, break, and disintegrate the moral-psychological staunchness of those against whom it is being waged.

The author discusses in detail Project "Truth" and the "Democracy" Program. The former was once sanctioned by executive order and by decision of the U.S. National Security Council. All measures prescribed by the project were concentrated around the greatly exaggerated myth of a "Soviet military threat" which allegedly endangered security and stability throughout the world. As an aggregate, the ideas of Project "Truth" were to confirm the alleged need to conduct toward the Soviet Union a harsh policy by means of pressure of force, threats, and blackmail.

In conformity with this plan, psychological warfare is constructed of a chain of various, closely interlinking propaganda actions. A campaign of "defense of human rights in the socialist countries" was supplanted, for example, by charges that the Soviet Union was encouraging "worldwide terrorism," and subsequently followed by the "Afghan question," the "Soviet military threat," and "Soviet chemical weapons." New far-fetched ideas appear in response to the development of events and the needs of the U.S. military-industrial complex: the suggestion that the Soviet Union is violating the provisions of SALT II (although the United States has never ratified it), and that the Soviet Union is allegedly utilizing space for military purposes (this campaign has rolled forward, clearing the way for implementation of U.S. plans to militarize space).

Project "Truth" was devised to ensure that these actions went forward in a coordinated manner and sufficiently aggressively, with a full effort by information assets, without losing steam and penetrating every corner of the globe.

The author reports that in February 1983 the U.S. State Department announced a program entitled "Democracy and Public Diplomacy." Presidential Directive No 77 pushed it through, bypassing any congressional discussion.

In the very first months following signing of Directive 77, the Washington Administration took a good many steps toward its implementation. In particular, President Reagan proclaimed a large number of "memorable dates," such as "Poland Day," "Afghanistan Day," and "Cuban Independence Day." All these hypocritical, provocative actions promote the external and domestic aims of the U.S. Government and further the "big lie," which is propping up Washington's strategic plans.

The author notes that while the strategic aims of imperialism remain unchanged, one can observe a certain evolution in the tactical goals and means of conduct of psychological warfare, new accents, and increasing harshness of many old slogans and formulas. Our ideological adversaries are endeavoring to act with increasing sophistication and are utilizing a differentiated approach to different social strata and groups, in order to upset the moral-psychological and ideological unity of the Soviet people.

As was emphasized at the All-Union Scientific and Practical Conference in Tallinn (1982), in dialogue with the worker class they are placing emphasis on the repeatedly debunked claims of "trade union freedoms" in the capitalist world. They persistently attempt to impress upon our kolkhoz peasantry the alleged advantages of private-enterprises agriculture. The attention of the intelligentsia is directed to unrestricted creative freedom which allegedly exists in the West. They are also seeking to approach youth, women, war veterans, and religious believers -- literally all the various social groups.

The author stresses that our aggressive position in the battle of ideas represents a concentrated expression of that historical fact that socialism is a higher type of social organization than capitalism. Thus the essence of a militant position lies in affirming the advantages and valuable assets of

socialism, Communist ideals, political awareness and consistent practical affirmation of the vanguard role of socialism in today's world.

This book is intended for a broad propaganda activist readership. It is unquestionably a considerable aid in ideological and counterpropaganda work.

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CSO: 9144/234

IN-AIR INSTRUMENT FAILURES DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) p 26

[Article, published under the heading "In Aviation There Are No Trivial Matters," by Military Pilot 2nd Class Capt B. Kononenko: "77 Nervous Seconds"]

[Text] After the weather reconnaissance plane returned, the pilots received their preflight briefings and proceeded to their aircraft. The fighters took off one after the other, precisely according to the timetable. Flight operations were proceeding at the customary pace. Suddenly the flight operations officer's voice came over the public address system: "Crash crew, ambulance and fire truck stand by!"

Everybody who heard the alert turned his gaze in the direction of the outer compass locator. Such orders are given for a reason. It meant that one of the aircraft was in an emergency situation.

It had happened as follows. A few minutes after his two-seater took off, Lt M. Starchenko noted that the instruments operating off the pitot-static system were giving incorrect readings. He reported this fact to his instructor, Maj L. Boldyrev.

"I see," came the calm reply. The instructor's composure had an effect on the novice pilot. Reporting the situation to the tower, the pilots aborted the training flight, commenced flying on the backup instruments, and proceeded to set up for a landing approach. On final they kept the aircraft instrument needles precisely as prescribed. They were materially assisted by GCA controller Capt A. Kolodeyskiy, who closely watched the blip on his radar screen and gave the pilots precise heading and glideslope data.

After the aircraft landed, aviation engineer service specialists ascertained the cause of the malfunction. The potential air mishap situation had occurred through the fault of ground crewmen who had done a poor job of preflighting the aircraft.

Back on the ground, discussing the flight in detail and analyzing every action by Lieutenant Starchenko, who had never before been in such a critical situation, Major Boldyrev calculated the time from moment of liftoff until the

malfunction was discovered, and chalked the number 77 on the board. He drew a circle around it and paused in thought. He recalled an incident which had happened long ago.

...Daylight flight operations were in progress, with persisting weather minimums. As he was on a landing approach, Boldyrev noted that his airspeed had begun dropping off sharply, while the vertical speed indicator needle was rapidly dipping. He looked at his artificial horizon and rpm gauge. These instruments were reading normal. The tower controller was also silent. Did this mean a problem with his gauges? Boldyrev reported the problem to the tower and shifted to his backup instruments.

The aircraft was getting closer to the ground. During this phase it is very important to maintain the proper forward speed, sink rate, and runway heading. But this was no simple matter, since all aneroid instruments, so essential to the pilot when landing, were giving random readings. He had to maintain airspeed according to engine rpm readings and pitch angle from his artificial horizon. He was dropping through a low overcast. As the seconds went by, he became increasingly more tense.

The ATC team was devoting all its attention to bringing Boldyrev's plane in. The GCA controller gave distance and height readings with increasing frequency....

The ground was looming closer. He was getting anxious to make visual contact with at least the runway threshold. This would be sufficient in order to correct any cumulative approach descent error. But the cloud bases seemed to extend right down to the deck. Only the precise heading and height reports he was receiving from the GCA controller confirmed that the aircraft was right on glidepath. The controller's calm voice inspired confidence. It was as if they were practicing emergency procedures on the simulator. The outer marker signal sounded, and the radio compass was supposed to switch over to the middle compass locator. But for some reason the ADF needle commenced turning aimlessly. Boldyrev reported the situation to the tower.

His voice was even, but the situation was tense. At this moment he caught sight of bright lights piercing through the clouds, and then the runway threshold appeared. He made a small heading correction. He determined the point to commence roundout. A few seconds later, and the gray runway was rushing past the aircraft's wing. Back at the flight line it was discovered that a foreign object had gotten into the pitot tube.

At the flight operations debriefing the unit commanding officer cited Boldyrev's cool handling of the situation as an example and commended him. The pilot replied in the regulation manner: "I serve the Soviet Union!" And added: "Credit goes to the ATC team. They helped out in a situation which lasted an eternity."

"An eternity?" the commander repeated, and smiled. "Calculations indicate that the whole incident lasted only a minute and 17 seconds...."

Two examples from actual flying experience. The common element which binds them is not only the chance coincidence of time from the moment of instrument failure to landing. They clearly showed such important pilot qualities as self-mastery, professional vigilance, and tenacity, based on knowledge of the most typical in-flight emergencies and crew response procedures. These qualities reliably guarantee both a high degree of pilot efficiency and psychological stability in the face of various in-flight problems.

When squadron commander Maj L. Boldyrev is preparing for a flight, he always carefully reads through the appropriate section of the aircREW manual and methods recommendations on performance of a given maneuver sequence, and runs through a cockpit drill. He teaches his men to do the same. As he sees it, the pilot's principal labor consists in thorough preparation on the ground for a mission in the air. This work is difficult, but it is essential in order to ensure that a military pilot will always emerge victorious from the most difficult situation.

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CSO: 9144/234

SWEPT-WING DESIGNER STRUMINSKIY'S CAREER OUTLINED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 28-29

[Article, published under the heading "Science Serving the Homeland," by Candidate of Technical Sciences G. Igorev: "Outstripping Sound"]

[Text] One does not readily recognize in this active, spontaneous person of modest stature an eminent, world-renowned scientist and full member of the USSR Academy of Sciences, a scientist whose talent and energy have been devoted to Soviet aviation. Academician Vladimir Vasil'yevich Struminskiy has devoted his brilliant life to the designing and building of aerodynamically sophisticated machines. Airplanes produced by almost all aircraft design offices are conquering space and time on his wings, on those swept wings which became a historic landmark on the evolutionary road of Soviet and world aviation.

Vladimir Vasil'yevich, who could not imagine himself in any other field of activity, smiles at the question: "How did you become an aerodynamicist?" and replies: "Purely by chance...."

And this indeed seems to have been the case. In 1938 this former lathe operator at the Dinamo Plant graduated from the physics faculty at Moscow State University. This A student, who graduated with highest honors, continued as a graduate student at the Moscow State University Institute of Physics. In May 1941 Struminskiy defended ahead of schedule his dissertation on the topic "Electron Theory of Solids." As we see, this topic is fairly far from aviation. One of his fellow graduate students recommended that he apply to TsAGI [Central Institute of Aerohydrodynamics imeni N. Ye. Zhukovskiy]. At this institute it was suggested that the young scientist, who was unacquainted with aircraft design, select several research areas adjacent to the research field of the "pure" physicists. Subsequently the principles of air flow past a wing attracted Struminskiy more than others, and they ultimately determined his entire career in aviation science.

The eager and curious nature of this tireless physics graduate student responded keenly to events taking place. And a latent interest in aviation was revealed in a practical way at TsAGI. It is insufficient to state that wing physics aroused Struminskiy's enthusiasm. The new area of research

totally captivated him. His dreams transported him away into the boundless heavens, where swift aircraft reigned supreme.

The young TsAGI scientist did not work long, less than a month, in a peacetime environment. The conflagration of war altered his plans. It was necessary to work on a priority basis to ensure the superiority of Soviet over fascist military aviation.

Our pilots demonstrated amazing boldness and courage in the skies over the battlefield. They compelled their winged machines to execute maneuvers which were incredible for the time, which brought them victories over an experienced and crafty foe. But in critical conditions, at high angles of attack, the airflow would treacherously separate from the wing and make the aircraft unstable. Struminskiy traveled to one of the long-range bomber airfields for the purpose of solving this problem. In the eyes of the combat aircrues this 27-year-old theorist looked like anything but a venerable scientist. They candidly sought to impose their own views on him, and they aggressively advanced or argued against various methods of combating flow separation.

Those heated debates accomplished a great deal. They helped find a solution which constituted Vladimir Vasil'yevich Struminskiy's first major contribution to the development of aviation. He and other TsAGI scientists were awarded a State Prize for theoretical and experimental elaboration and subsequent adoption into regular production of new wings consisting of a group of configurations with wingtip sections which did not cause flow separation. This was the first award he had ever received. And such a lofty one right at the outset!

By war's end fighters in service had increased their top speed to 650-750 km/h. The effort to boost speed was proceeding with growing intensity. A limit seemed to be encountered at a certain stage, however: as soon as an aircraft reached the speed of sound, air resistance increased by a factor of more than 10, forming a unique barrier ahead of the aircraft. Attempts to overcome the sound barrier on aircraft of old aerodynamic shape by employing liquid-fuel jet engines were unsuccessful -- upon reaching the "barrier," the aircraft would lose stability.

Vladimir Vasil'yevich Struminskiy and his colleagues felt that it was essential to gain a complete understanding of these puzzling phenomena before achieving supersonic speeds. Between the regions of low and supersonic speeds they discovered a transition region of mixed -- subsonic and supersonic -- gas stream flow. Their mechanisms were not amenable to rigorous theoretical examination. It was necessary to conduct experiments in wind tunnels in combination with theoretical investigations.

Various aerodynamic designs of new swept wings were devised after some time. With understandable caution Semen Alekseyevich Lavochkin placed on the La-160 aircraft, in place of a straight wing, a wing with a sweep angle of 35 degrees. Col I. Fedorov, flying this aircraft, was the first to reach a speed of 1,000 km/h. The aircraft designer and the aerodynamicist, buoyed by this success, decided to take the next step: they added an additional 10 degrees of sweep. And the "aerodynamic Everest" was conquered! Maj O. Sokolovskiy,

flying an La-176 aircraft powered by a VK-1 engine, was the first to fly at the speed of sound. The sound barrier was conquered almost simultaneously by MiGs and Yaks.

Joint work by V. Struminskiy, A. Dorodnitsyn, and S. Khristianovich on aerodynamics of high-speed swept wings was highly praised by the scientific community and our country's aviators. In 1947 Vladimir Vasil'yevich was awarded a Gold Medal imeni N. Ye. Zhukovskiy for outstanding work on aircraft theory. That same year he and his colleagues were once again awarded a State Prize.

Conquest of the sound barrier was a major event in aviation. By opening up the world of supersonic speed for fighter aviation, the new aerodynamic designs also gave new possibilities to bomber aircraft. In "harness" with a jet engine, the heavy aircraft could attain fighter speeds. Vladimir Vasil'yevich Struminskiy presented this idea to A. Tupolev. At first Andrey Nikolayevich entertained doubts as to the kinship between a swept fighter and bomber wing. Before embodying the new wings in metal, the aircraft designer decided to verify their concept proper: if it withstood the "blows" of design engineer experience and intuition, it would be accepted by the experimental design office.

The Tu-16, which even looked fast, appeared at the test field. The grass growing on both sides of the runway, as if in nervous agitation, trembled under the onslaught of the powerful exhaust streams from the jet engines. Slowly the heavy aircraft, as if deliberating the matter, began its first takeoff roll.

Today, when the swept wing has become just as natural and customary as, let us say, the monoplane had become at one time in the past, supplanting the biplane, it is hard to picture the tenseness of the people who were waiting for the return of their offspring from its first flight.

Without noisy ovations or thundering kettledrums, the final stage of an immense effort to design and build the first jet bomber, the Tu-16, ended with a mere congratulatory handshake. This aircraft, with a swept wing and tail designed by a team of aerodynamicists which included V. Struminskiy, was a good decade ahead of its time.

In the 1960's Struminskiy became an eminent scientist, a corresponding member of the USSR Academy of Sciences, and deputy head of TsAGI, where the designs of all Soviet aircraft designers were perfected. Following the lead of A. Tupolev, other aircraft designers incorporated speed into their heavy machines.

Through the efforts of the specialists at TsAGI, many highly complex problems in the field of aerodynamics had been successfully solved by the mid-1960's, which fostered the rapid development of aviation and the space program. Our scientists, including Struminskiy, were persistently continuing their quest. Having squeezed everything possible out of wing shape, they proposed to work on another area of potential -- boundary layer, to control it and eliminate dangerous turbulence. They were no longer satisfied with merely conquering

sound and even supersonic speed. Theoretical studies indicated the possibility of designing and building cargo and passenger aircraft flying at hypersonic speeds of up to 15-20 thousand km/h. In order to reach such speeds it would be necessary to fly at altitudes of at least 50 km, which in turn would become possible by replacing the traditional kerosene fuel with hydrogen. With the attainment of such speeds and altitudes, aviation would be approaching very close to astronautics.

Lenin and State Prize recipient Academician Vladimir Vasil'yevich Struminskiy organized theoretical and experimental investigations on future problems of aviation. An aggregate of installations were built under his supervision: low-turbulence subsonic and supersonic wind tunnels, periodic-flow supersonic and hypersonic wind tunnels, hypersonic pulse-type installations for high Reynolds numbers, vacuum tunnels, and cryogenic test beds.

Studies and calculations confirmed the possibility of substantially reducing aircraft friction drag by means of achieving a laminar-flow boundary layer and, as a consequence, reducing aircraft fuel consumption and air pollution.

The young space program was also expecting a great deal of the institute. Upon entering the atmosphere a spacecraft must precisely maintain the parameters of a complex trajectory enabling it to return safely to Earth. Therefore there was an extreme need for reliable data on the aerodynamic forces which act on a spacecraft in the upper layers of the atmosphere. The principles of traditional high-speed aerodynamics, however, proved inapplicable to a rarefied atmosphere. What was the solution?

Finally this problem was successfully solved in 1968. As a result, with several modified initial conditions, it was possible to utilize to altitudes of 70-80 kilometers virtually those same principles of traditional gas dynamics with which scientists had already become fairly well familiar in the process of designing supersonic aircraft.

Academician Struminskiy and his colleagues took the initiative to utilize for the needs of the nation's economy vast theoretical and experimental research material amassed at aviation and space program scientific centers. The chemical industry was that branch which first felt the beneficial influence of aviation. At first chemists did not even suspect the obvious influence of the principles of aerodynamics on chemical reactions. Development of a more efficient configuration and shape of chemical reactors and lines led to a decrease in energy consumption and elimination of reject-grade final product. Such studies are currently being conducted by personnel of the USSR Academy of Sciences Mechanics of Inhomogeneous Media Sector, under the supervision of V. Struminskiy. Of course automotive enthusiasts could not help but take note of the yellow "Rafik" which they modified and improved, which burns a mixture of gasoline and hydrogen.

Successes have also been achieved in research hastening implementation of the nation's food program. Recently tests were completed at the Novocherkassk Chemical Plant on a new installation for the manufacture of nitrate fertilizers. Directionally-focused streams of air produce good results in drying grain. And stockmen have shown an interest in a compact unit producing

oxygen from air. It has been ascertained that by saturating feed with oxygen one can achieve substantially greater weight gains in fattening livestock.

But has aviation been forgotten? Of course not! One cannot conceive of an aerodynamicist who does not dream about the sky. Aircraft engineering has not yet gotten everything out of the boundary layer. Vladimir Vasil'yevich is presently experimenting with a new wing, through tiny apertures in which the turbulent portion of the layer is drawn off, with laminar flow across the surface. He confers, debates, and disagrees. And he is gladdened if he suffers "defeat" at the hands of his pupils, graduates of the Moscow Institute of Applied Physics [MFTI], the higher educational institution which he, together with P. Kapitsa, S. Khristianovich, A. Makarevskiy, and other prominent scientists, established under the auspices of TsAGI at the end of the 1940's. Since that time he has been teaching and serving as a department head at this institute alongside his work at the USSR Academy of Sciences.

V. V. Struminskiy continues to be of good cheer and filled with energy. He continues to seek out new ideas and solutions. He dreams of large-scale adoption of new scientific research results. Advance in aviation makes this mandatory.

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CSO: 9144/234

SIGNAL TROOPS LEARN LESSONS FROM 'SHIELD-84' EXERCISE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 30-31

[Article, published under the heading "They Support Flight Operations," by unit deputy commander Lt Col P. Klebanyuk: "Boosting Tactical Proficiency (Based on the 'Shield-84' Exercise)"]

[Text] The strenuous days of the "Shield-84" [Shchit-84] exercise are still fresh in our memory. At this point we should like to take a closer look at our fighting men's experience from a calmer perspective after the fact, in order better to understand the sources of their professional and tactical maturity.

As the exercise demonstrated, victory in today's battle is won only by those who work with determination, innovatively carry out assigned mock combat missions, and develop an efficient, logical thought process. A no less important factor for achieving success is tactical knowledgeability on the part of commanders and staff officers and tactical proficiency on the part of all personnel. In order to gain deep understanding of the nature of today's warfare, the men of our unit work persistently to study possible changes and skillfully apply in a practical manner their amassed specialized knowledge and acquired skills.

I recall a special tactical drill held shortly prior to the "Shield-84" exercise. It was conducted by the commander of one of our companies, Capt I. Fedorkov. The drill was attended by officers who would be subjected to a difficult, critical test -- providing communications at such a large-scale exercise to aircrews of various air components.

Having received a mission briefing, Fedorkov carefully studied the terrain on a map. And although the officer had worked on this topic before, he was nervous, for it is far from sufficient merely to conduct a training drill at a satisfactory methodological level. It is essential to handle the rigid standards of combat performance taking into account the psychological stress load during a march, especially during operations on "contaminated" terrain.

At the special tactical drill the radio teams were to perform difficult tactical missions while located at a considerable distance from each other.

Nevertheless the officer, ably handling the situation, successfully coped with all scenario instructions working together with party activists, providing the command authorities and aircrews with uninterrupted communications. The obtained experience came in very handy later during the performance of mock combat missions at the "Shield-84" exercise.

In making a decision and giving an order to subordinates, each of us officers endeavors to figure out the "adversary's" intentions in a prompt and timely manner, to anticipate his actions, and to seize the initiative. And all this in conditions of an acute shortage of time. If one fails adequately to appreciate the demands of today's combat, errors and deficiencies in one's performance are inevitable.

Soon after the "Shield-84" exercise I got together with the officer in charge of one of our crews. He told me that at the most recent training drill everything had gone well at first, but when the "aggressor" had proceeded to employ combined jamming, the situation deteriorated considerably. His crew had difficulty accomplishing the assigned mission.

What had happened? The officer had taken part in many training drills in the past and had competently performed the basic station operation and maintenance tasks. At this point I recalled that at recent brief tactical exercises this officer had frequently kept silent and was not learning to respond instantly to situation changes. As a result, if there was the slightest deviation from the accustomed routine, he would become confused. "Therefore," I said to myself, "we must more vigorously incorporate into the subunits the lessons learned at the 'Shield-84' exercise."

It was then that it was decided to devote the most serious attention to this matter. I wanted to discuss the takticheskaya letuchka [brief tactical drill] because it offers the most flexible form available for increasing the men's combat maturity and can be held practically during any training session. At the same time it is not merely a practice drill. A letuchka develops the thinking process. It is for some reason not held in high regard, however, in a number of subunits. Some commanders claim as an excuse that there is not enough time to conduct such an activity. But this argument fails to hold water. A commander who is concerned with increasing his men's skills will always find time. But it is important that the brief tactical drill be of a specific, dynamic nature, arouse interest in the men, and develop their tactical thinking.

Of course no brief tactical drill or practice session can fully reproduce all the specific features of today's combat against hostile aircraft. Certain departures from reality are inevitable. They should be kept to a minimum, however. Presently, taking into account the lessons learned at the "Shield-84" exercise, we are seeking to achieve this by thoughtful planning and scheduling of training sessions and by correct utilization of the various communications gear in a specific environment or situation.

Committing tactical control algorithms to memory, today the commander does not begin from zero in decision-making. It remains for him innovatively to interpret one of them, introducing certain additions and changes dictated by

the situation, in conformity with the present tactical environment. Operating precisely in this manner, our communications personnel recently accomplished a difficult mock combat mission in excellent fashion under field conditions.

At the present time at a brief tactical drill in any of our subunits the men are briefed on the mock combat situation right at the commencement of the exercise. These drills serve as an effective aid in testing the tactical maturity and level of individual officer proficiency.

The subunits in which Capts A. Osadchuk, Yu. Kruglyy, V. Dem'yanenko, and others serve have an innovative approach to the conduct of such drills. They not only unwaveringly observe the requirements placed on brief tactical drills but also flexibly and efficiently incorporate all progressive and advanced innovations which stood up to rigorous test at the "Shield-84" exercise, which are time-tested and help achieve effective professional development of signal troops officers.

Tactics is a core subject in the commander training system. We allocate a good deal of time to working on problems of tactics in commander training schedules. In recent years there has been an appreciable improvement in training facilities designated for these purposes. One cannot state, however, that existing possibilities are being efficiently utilized. During a recent performance evaluation officer N. Minakov, for example, ascertained that tactical training classes with the officers of one of the subunits were being conducted in an excessively simplified tactical environment. He immediately reminded the instructor that without amassing the requisite methods skills a subunit commander will be unable to create for his men a complex, instructive situation approximating actual combat, will be unable efficiently to utilize training time or achieve a high degree of competitiveness in training activities.

We also feel that it is important to campaign persistently for an improvement in the quality of commander training, and particularly officer tactical maturity. We should like to emphasize that a great deal depends on the platoon and company commanders themselves and on their independent study, persistence, diligence, innovative activeness, and purposefulness in training.

The experience of vanguard subunits which took part in the "Shield-84" exercise convinces us, for example, that it is advisable to hold a brief tactical drill after studying a specific, usually the most complex topic or group of topics in order to reinforce the subject material and to acquire solid skills, especially in competent command and control of the combat actions of one's subordinates. We endeavor to ensure that the men perform job duties one level higher than the position they hold, as was sometimes necessary during the "Shield-84" exercise.

The commander approves the subject matter of brief tactical drills in conformity with the tasks being performed by the radio station crew or the subunit as a whole. Such items as the following, for example, are presented: "Method of readying communications gear for field operation"; "Techniques of organizing stable communications with the higher command echelon and with aircrews"; "Preparing an action report"; and others. We prepare and draw up a

schedule and plan for the brief tactical drill in advance. We concisely state the problem and concept, provide methods indications to the instructor, and determine the procedure for grading the officers' performance. When grading the performance of an officer performing the functions of officer in charge, for example, we determine the degree to which he masters the ability continuously and comprehensively to evaluate the air situation, how correct his actions are pertaining to making the crew or subunit combat ready, how precisely and promptly he assigns tasks to his men, and how he maintains communication with coordinating subunits.

We consider the principal aim of brief tactical drills that of increasing the knowledge of officers as well as warrant officers in charge of radio station crews, equipping them with skills in independent tactical situation analysis and forecasting, correct decision-making, precise and competent assignment of tasks to subordinates. In addition, brief tactical drills serve as a tested and proven means of testing whether the men have assimilated key items of the tactical training program as well as knowledge obtained at group training sessions and in the process of independent study.

Depth of presentation of items at such drills, creation of a complex tactical environment, current relevancy of the points being worked on, activeness on the part of the men, as well as a substantive analysis -- all this makes training instructive. A great deal depends on the instructor and his ability to approach things in an innovative manner.

The instructor should devote close attention to devising and formulating scenario instructions. This is how our best methods experts officers N. Serbin, S. Kondrat'yev, and others proceed. The scenario instructions which they give to their men are distinguished by precise clarity and novelty, and are concisely formulated, while they objectively reflect the combat work performance of aviation communications personnel at the most important and complex stages. At the same time officers seek to obtain precise, clear, and concise replies from their men. By means of this they teach them not only intelligently to formulate replies but also, and first and foremost, to see their actions behind these replies, actions which should be efficient and purposeful. In the process of training activities they do not permit routine, predictable actions by their men and do not reject decisions made by officers in charge of station teams without sufficient grounds. If these decisions are too contradictory or conflictive, however, when summarizing performance results from a scenario instruction they clearly show the positive and negative elements of each decision and present to the men an optimal variant of actions in a specific tactical situation.

Unquestionably brief tactical drills are only one of the component parts of the learning process. For this reason we work persistently to ensure that the skills acquired by specialist personnel are continuously improving. And this is determined by the methods skill of the subunits' officers and their ability to prepare well and skillfully conduct special tactical exercises, brief tactical drills, and other types of training activities with their men.

Our tactical training classroom provides extensive capabilities to improve the methods skills of leader personnel. Work stations are equipped with special

displays, plotting boards, monitoring devices, and reference tables. To provide more reliable command and control of radio station teams, innovators fashioned special monitoring equipment, to which is fed information on changes in the tactical environment at a given moment. There are also tactical control algorithm preparation diagrams, presenting in concentrated form the experience and know-how of the best subunit commanders. Uniform methods of solving training problems have been prepared and are being adopted, and recommendations have been given for more effective coordination of station teams and utilization of training equipment. In addition, officer training classes are held on a regular basis, at which officers work on mastering methods of phase-by-phase forming of appropriate actions.

Training guides have been prepared in the subunits on the basis of the experience of the "Shield-84" exercise and taking into account the element of surprise. They indicate various tactical "surprises" which the "aggressor" may offer. The ground environment is also made more complex at the same time. Our vanguard commanders endeavor at the most high-stress moments of combat training to play without warning tape-recorded shell and aircraft bomb bursts, the roar of jet aircraft turbines, and the sounds of a vigorous exchange of fire. And they always prepare scenario instructions calling for personnel to operate while wearing individual protective gear. Also figured into the scenario are "casualties" and the resulting increase in work load on the remaining specialist personnel. This develops in aviation communications personnel an additional reserve store of psychological fortitude.

The majority of our specialist personnel are presently working at one level higher than their current proficiency rating, while radio station operating crews are developing good combat teamwork and cooperation and the ability to perform difficult tasks with confidence.

In the course of tactical drills and exercises we seek to ensure that every team member immediately understands his superior and carries out his orders and instructions swiftly and with initiative. Therefore every specialist endeavors to have in readiness all data which may be required for decision-making. At all times this data should be exhaustively complete and absolutely reliable. This by no means signifies, however, that every piece of information received should be immediately communicated to the officer in charge. Secondary information and excessive detailing merely make his job more difficult in decision-making. Therefore tactical competence and the ability efficiently to analyze the situation must be developed both in the commander and in his men.

The ability correctly to evaluate the current tactical situation, to foresee its subsequent development, and the ability to make and execute a decision which ensures accomplishment of the combat mission do not come automatically. They are formed, shaped, and perfected in the process of daily training, in the course of training classes, drills, and tactical exercises, which precisely for this reason should be organized and conducted at a high pedagogic level and should incorporate unexpected, emergency situations. Only with this approach to things can one count on unconditional success in accomplishing the assigned task.

The experience of our vanguard subunits indicates that one of the decisive factors in improving the quality of tactical training of station teams and subunits is skillfully organized socialist competition. And wherever it has truly become an integral part of the training and indoctrination process, the professional development of military personnel proceeds more rapidly and they achieve tactical maturity sooner. There is a large area of activity here for our commanders, political workers, party and Komsomol activists.

The search for ways to incorporate the experience of the "Shield-84" exercise and to increase the tactical proficiency of station crews produces the greatest effect if weak links in the training of specialist personnel, station crews and signal subunits are promptly revealed in the process of competition on tasks and performance standards. At one time, for example, we were poorly handling such items as extended marches and redeployment of communications equipment to new locations, due to inadequate training of young specialized vehicle drivers. Practical and effective measures were immediately taken to correct deficiencies. And competition hastened their elimination.

The campaign to intensify the training process taking into account the experience of our communications personnel at the "Shield-84" exercise is constantly advancing new and more complex combat training tasks. We endeavor to accomplish them innovatively, skillfully, with a view to the future and striving for excellent end results, ensuring favorable conditions for continuous improvement in the quality of tactical training, smooth teamwork and coordination of crews and subunits, full, prompt and timely accomplishment of socialist pledges made by personnel for the new training year, the year of the 40th anniversary of our Great Victory over German fascism.

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CSO: 9144/234

FIGHTING CORROSION ON AIRCRAFT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 32-33

[Article, published under the heading "Recommendations of Science Into Practical Operation and Maintenance of Combat Equipment," by Candidate of Technical Sciences and Docent Col Ye. Ivanov: "Combating Corrosion"]

[Text] "Increase environmental protection, protection of the Earth and its resources.... Devise and adopt highly-effective methods of increasing the strength properties, corrosion resistance, heat and cold resistance of metals and alloys, metal structures, pipes and tubing; increase production of new structural materials, coatings and product items based on metal powders...."

From the Basic Directions of Economic and Social Development of the USSR for 1981-1985 and the Period up to 1990.

Industry presently utilizes more than 80 different metals, of which more than 10,000 alloys are produced, used in the manufacture of modern equipment, including aircraft. In many instances metal items come into contact with an active medium, as a result of which corrosion develops, which shortens useful life and worsens the service properties of machinery parts. Great detriment is caused by corrosion. Direct metal losses due to corrosion, for example, amount to 10 percent of the total annual metals production volume. Aggregate loss in industrially developed countries comprises 5 percent of national income. In particular, it is estimated at 70 billion dollars annually in the United States, and 19 billion marks in the FRG.

This is why our party and the Soviet Government assigned ministries, including the aircraft industry, specific tasks pertaining to protecting metals and structures against corrosion. A large team of prominent scientists, engineers, and technicians was recruited to solve these problems. For example, basic research and practical applied work in the field of corrosion and protection of metals were performed by Soviet scientists Ya. Kolotyrkin, G. Akimov, A. Frumkin, N. Tomashov, V. Batrakov, N. Zhuk, and others. Their recommendations serve as a good help for aviation personnel, including Air Forces ground maintenance specialists.

Our fixed-wing and rotary-wing aircraft are operated in various weather and climatic conditions. In many areas aircraft are subjected to the effects of dust as well as salts contained in the soil. Salt particles adsorb moisture from the air and form an electrolyte, which causes corrosion damage to the airframe skin and aircraft systems. This shortens an aircraft's service life.

Damage by electrochemical corrosion of aircraft load-bearing structural members made of high-strength alloys presents a serious hazard. According to reports in foreign sources, there have occurred instances of sudden failure of stabilizer spars, landing gears, and aircraft wing assemblies. Separation of parts made of aluminum and magnesium alloys is extremely dangerous. Investigation of these facts has established that point corrosion or pitting is one of the most complex types of electrochemical corrosion. It attacks an aircraft's clad duralumin skin sections and steel compressor blades in gas turbine engines. And propulsion plant hot-section components are subjected to gas corrosion. The metal rapidly oxidizes, transforming into oxides. Turbine blades, nozzle blades, and flame tubes can be destroyed by high-temperature corrosion and erosion in a stream of gases containing aggressive components and solid particles. In addition, at high temperatures intensive oxidation of turbine blades impedes a rise in gas temperature at turbine inlet and increase in engine efficiency.

Most alloys used in the manufacture of modern aircraft possess elevated corrosion resistance only in one or several aggressive media. Parts made of aluminum alloys, for example, possess high corrosion resistance in a gaseous oxidizing environment but break down in alkaline media. Titanium parts are resistant in seawater. It has been calculated that it would take 4,000 years for titanium to corrode through to the thickness of a sheet of paper. When heated, however, it intensively interacts with gases.

Protection of aircraft against corrosion is organized both at the stage of aircraft design and in the process of operation and maintenance. Aircraft designers and specialists should be thoroughly familiar with theory of corrosion and not only be able to select appropriate materials but also to avoid stagnation zones and apertures where actively corroding structure areas may develop due to inadequate oxygen. Therefore specialists incorporate drain holes into structural components where water may collect. Designers should avoid contacts between components made of different-base alloys. There should be no contact, for example, between magnesium components on the one hand and steel and copper on the other. Corrosion currents of appreciable magnitude may even occur at the juncture of two stainless steels of differing composition.

The most widespread method of protection against electrochemical and chemical corrosion is the employment of metallic paint-varnish films. Gas turbine engine turbine blades are protected against gas corrosion by a coating manufactured on a nickel or cobalt aluminide base. In order to protect an aircraft's skin against electrochemical corrosion, high-strength sheets of duralumin are clad -- an outer layer is applied, consisting of purer aluminum. During the making of complex-shape parts of it, they are subjected to anodic oxidation, forming on the surface a film of aluminum hydroxide, after which

they are further processed. The outer skin surface is coated with a varnish, while the interior surface is primed and painted with enamels of the desired color.

Components made of steel are protected against electrochemical corrosion by electroplating-anodizing with cadmium and zinc-plating. Cadmium-plated surfaces are highly resistant in damp environments. They are therefore recommended for aircraft operated in conditions of a hot coastal climate. Zinc-coating is effective against breakdown by atmospheric corrosion as well as in cases of direct contact between metal and fuel.

As we know, magnesium alloys are widely employed in aircraft. They are also subject to corrosion and require protection against it. Oxidation and paint-varnish coatings are utilized for these purposes. Parts are treated chemically or electrochemically, and paint-varnish coatings are applied to the oxidized layer.

During aircraft maintenance aviation engineer service personnel must constantly monitor the condition of a paint coating and protect it against the sun's rays, rain and icing. To protect these coatings on aircraft operated in conditions of elevated ambient air temperatures, one should leave between the airframe surface and cover an air interlayer up to 10 mm thick with the aid of rubber or plastic foam spacers. One should always bear in mind that fuel, lubricating oil or hydraulic fluid coming into contact with the skin of an aircraft, just as mechanical damage to the skin, promotes the forming of corrosion.

High humidity and relatively high fuel temperature create favorable conditions for the development of bacteria and the appearance of mold fungi, which are almost always present in petroleum products. These microorganisms release acid substances in the process of metabolism, which leads to the occurrence of microbiological corrosion. It can cause a tank leak, can foul automatic control devices and clog filters. Effective measures of combating it include regular draining of sumps, timely flushing of systems, as well as employment of bactericidal and fungicidal fuel additives.

Inhibitor protection is widely employed in the maintenance and storage of aircraft: special preparations are introduced in small doses into the corrosive medium for the purpose of diminishing its damaging effects. More than 100 inhibitors have been recommended, for example, to protect ferrous and nonferrous metals. This method is effective for systems with a continuous, varying or little-renewing corrosive environment, such as the gas-flow cavities of a gas turbine engine, cooling systems, as well as during storage and transport of equipment.

Oils, greases, and desiccants are employed as protective means in the short-term storage of aircraft. This is the cheapest method and an effective means. Such desiccants as silica gel and zeolites reduce relative humidity inside a packaging space to as low as 20 percent. One should bear in mind, however, that this method hastens the process of aging of items made of nonmetallic materials -- rubber and plastics.

As we see, the problem of combating corrosion remains an important problem in present-day conditions. Its successful resolution helps increase the operational and performance reliability and increases the service life of aircraft and armament.

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CSO: 9144/234

COURSE OF STUDY FOR OVERHAUL DEPOT BRIGADE LEADERS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) p 33

[Article, published under the heading "Attention -- Experiment," by D. Yermakov, aircraft enterprise scientific organization of labor laboratory chief: "Brigade Leaders Boost Expertise"]

[Text] The party is constantly concerned with improving the system of training cadres both in the civilian economy and in the military. One of the manifestations of this solicitude was the CPSU Central Committee and USSR Council of Ministers decree entitled "On Measures to Achieve Further Improvement of Training and Boost the Skill Level of Workers in Production," which expanded possibilities of implementing a uniform policy in the area of training skilled workers and coordinating the efforts of ministries and agencies in this important area.

This decree served as a new stimulus to improve the training of skilled workers also at enterprises of the USSR Ministry of Defense, including aircraft enterprises. The following forms of training are employed at Air Forces enterprises for the purpose of upgrading worker qualifications: production-technical training courses, specific-purpose training courses, schools for study of advanced work techniques and methods, and study courses for brigade leaders [brigadiry]. We should discuss this last form in particular, since a decree of the USSR Council of Ministers and All-Union Central Trade Union Council, entitled "Measures to Achieve Further Development and Increase the Effectiveness of the Brigade Form of Organization of Labor and Labor Incentives in Industry," was devoted specifically to this question.

I shall use the example of the enterprise directed by officer V. Mironov in discussing how this work is organized and what are its results. A two-year course of training for brigade leaders is successfully in operation here, and a certain amount of experience has been amassed, which can be utilized by the scientific organization of labor people at aircraft overhaul enterprises in setting up similar courses of study.

How did it begin? Naturally with determining the study objective. It consisted in the following. In order successfully to lead a brigade and to perform the duties of a brigade leader, in addition to possessing professional

knowledge and skills prescribed by the appropriate documents, in particular the job description guide, he should be thoroughly familiar with the production process and production organization, norm-setting and the procedure of determination of wages in the brigade with employment of a labor participation factor, requirements on product quality, and he should have the ability to organize socialist competition in his brigade, to organize worker activities on the basis of brigade labor organization charts, he should be able to combat work time losses and, finally, closely monitor observance of industrial safety regulations.

The enterprise's leading specialists and brigade leaders visited the Kaluga Turbine Plant, where they were briefed on organization of production, the work of the brigades, and training of brigade leaders. They then proceeded to draw up a program. It was based on recommendations of the Labor Scientific Research Institute, the brigade leader training program at the Kaluga Turbine Plant, as well as the requirements of corresponding orders issued by the USSR minister of defense and normative documents of this branch of industry. In final form the program consisted of a training schedule figured for 64 class hours, as well as methods recommendations for it. It was approved by the enterprise council of brigade leaders and ratified by the chief engineer.

We enroll brigade leaders and the best workers into the course of study on the recommendation of the brigade leader councils of the shops. Classes are held outside of working hours. Leading specialists present lectures on problems of organization of labor, discipline, and indoctrination. The enterprise chief also frequently gives lectures.

Last year two thirds of the brigade leaders completed the course of study; they were given special certificates of completion in a solemn ceremony. These certificates entitle their recipients to be elected leaders of production brigades.

Practical experience has confirmed the correctness of the chosen path. The brigade leaders who completed the course of study began leading their people more competently, conducting indoctrination work with them in a more purposeful manner, and communicating to every individual party and government decisions pertaining to matters of economics and politics, and on this basis focusing workers toward achieving the highest labor results. In these brigades there are practically no instances of violation of labor and process discipline, and the quality of the product they turn out is rather high. Take, for example, the workforces led by A. Bogdanov, Yu. Zyablov, and B. Kuz'min. They became leaders in socialist competition and were awarded challenge pennants and honorary certificates. Brigade members received cash bonuses.

Thus adoption of the brigade leader course of study has produced positive results. The rate of labor turnover has dropped. Last year the enterprise generated savings of several thousand rubles. In the final analysis all this

constitutes a substantial contribution to the common cause of strengthening
the defense capability of our great socialist homeland.

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CSO: 9144/234

CHANGING AIRCRAFT INSPECTION SCHEDULE FROM HOURS LOGGED TO CALENDAR TIMETABLE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 34-35

[Article, published under the heading "Innovations in Aircraft Maintenance," by Candidate of Technical Sciences Maj Gen Avn A. Subbotin: "On Calendar Timetables"]

[Text] Further increase in the combat readiness of Air Forces units and subunits and improvement of the system of aircraft maintenance is one of the most important tasks of Aviation Engineer Service personnel. Many years of experience in performing routine inspection and maintenance procedures, the extent and frequency of which are determined by hours logged, indicates that the existing system contains certain shortcomings.

Frequently over the course of the annual cycle of aircraft utilization in line units, one observes a lack of uniformity in flight time logged, especially during a period of tactical air exercises and other activities. At service schools this occurs chiefly in the summer period of training, when 70 to 80 percent of the year's flight time is logged. Consequently over the course of the year aircraft do not proceed in a smooth, uniform flow to the technical maintenance unit for routine inspection and maintenance procedures. The simultaneous appearance of a large number of aircraft in the technical maintenance unit service area increases the work load on personnel and makes organization of performance of maintenance procedures more difficult.

At the same time the dispatching of a specified number of combat aircraft for routine scheduled inspection and maintenance forces a commander to fly those aircraft he has available. As a result they log more flying time and are also more heavily work-loaded. And finally, since the number of times each aircraft goes to the technical maintenance unit is directly proportionate to its logged flight time, one aircraft may make several visits over the course of a year, while another may not be sent even once. And yet inspection and maintenance procedures form the basis of maintaining the desired aircraft reliability. In addition, the presently-existing system of fixed-wing and rotary-wing aircraft maintenance calls for the performance of preventive maintenance procedures on a calendar timetable. As we know, these procedures include all types of aircraft preflighting operations, specific-purpose and periodic inspections, winterizing and summerizing procedures. These measures

make it possible to discover problems connected with occurrence of corrosion, loss of elasticity by seals, and change in the physicochemical properties of components and devices.

In short, possibilities for improving the existing system of aircraft maintenance are quite extensive. Practical experience has confirmed the necessity of shifting to a new, progressive system, which consists essentially in performing inspection and maintenance procedures on fixed-wing and rotary-wing aircraft on a calendar timetable basis rather than by flight hours logged. It exerts considerable influence on further boosting the combat readiness of Air Forces units and subunits. The advantages of the new system are due chiefly to the improved organization of the activities of the units' aviation engineer service, particularly due to the smooth, precision work operations of the technical maintenance unit, as well as the considerable possibilities for efficient utilization of highly-skilled technical maintenance unit specialists for putting aircraft back on the line and performing complex adjustment operations on the aircraft primarily in the squadrons.

Uniform technical maintenance procedures, which contain a number of specific features, have been drawn up for each type of aircraft in order to organize prompt transition to the new system. First of all we shall note that the type of preparation of aircraft for flight operations and aircraft storage procedures have undergone virtually no major changes. But the 50-hour inspection has been eliminated, while the 100, 200, and 300-hour inspections have been redistributed respectively between the 12 and 24-month inspections for fixed-wing aircraft and the 6, 12, and 24-month inspection for helicopters. In addition, periodic servicing procedures prescribed for helicopters include lubrication as well as cleaning of powerplant automatic fuel system filters.

These differences in the structure of uniform maintenance regulations for fixed-wing and rotary-wing aircraft are due to a number of factors. As a rule helicopters log more flying time. In addition, they are usually based at rather austere, including dust-problem sites. And yet they are equipped with heavily-loaded dynamic systems -- power transmission and rotors -- which are lacking on fixed-wing aircraft.

An annual schedule for sending aircraft into the shop for scheduled inspection and maintenance is being drawn up in the unit for transitioning to a system of performing maintenance on a calendar timetable. Aviation engineer service supervisors determine the number of fixed-wing or rotary-wing aircraft to be sent each month to the technical maintenance unit (the total number is divided by the number of months in the year, and the result is rounded off to the nearest whole number). Aircraft are arranged in ascending order by flying hours remaining to the next inspection. Hours remaining to inspection is the number of flight hours logged to the next 100 (200)-hour inspection, that is, to completion of the period between inspections, taken in calculations as equal to 100 hours of flying time logged.

Fixed-wing and rotary-wing aircraft with the least hours remaining will be scheduled for inspection during the first month, with others scheduled

subsequently according to hours logged. With an equal number of flying hours logged between inspections, a priority position in the sequence for sending to the technical maintenance unit shall be given to the aircraft with the greatest total number of hours on the airframe and powerplant, and if these figures are also equal, to that fixed-wing or rotary-wing aircraft which has logged the greatest number of hours since the most recent 200-hour inspection. At the end of each month engineers shall revise the schedule for sending aircraft to the technical maintenance unit for the following month taking into account actual flying hours logged. The schedule also indicates the specific date an aircraft is taken to the technical maintenance unit.

A permanent team of maintenance specialists is designated in each technical maintenance unit group to perform periodic inspection procedures. Their principal task is to perform inspection procedures in a high-quality manner while observing the timetable. Experience indicates that it is advisable to specify on the maintenance sequence schedule preventive maintenance on two aircraft simultaneously, shifting the inspection procedures commencement time on the second aircraft by 30-50 percent of the total duration of all inspection and maintenance procedures. This creates conditions for a substantial increase in the total amount of work in progress and will help almost double the maintenance personnel utilization factor.

The remaining maintenance specialists in the groups ensure high-quality and prompt performance of scheduled specific-purpose inspections and checks with subunit aviation engineer service personnel, as well as return to service of aircraft taken off the line. The technical maintenance unit personnel assigned to this work utilize spare equipment and work according to a plan coordinated between the technical maintenance unit chief and the unit engineer of the appropriate specialization. When aviation personnel redeploy to another airfield, maintenance specialists should also be prepared to repair aircraft. Assignment of a group of technical maintenance unit specialists to perform the enumerated tasks will create favorable conditions for boosting the men's job-related skills to repair damaged aircraft and will increase flexibility and efficiency of performance of all preventive maintenance work on said aircraft.

We should note that a uniform work-loading throughout the course of the year and a smooth flow of technical maintenance subunit activities are not the only advantage of the new system of performance of inspection and maintenance. If an exercise is scheduled, for example, at which a maximum number of aircraft (helicopters) will be utilized, adoption of this system will enable the commanding officer to "hold back" aircraft scheduled for inspection and maintenance during the period of the tactical air exercise. Time allowances for calendar-scheduled time between inspections have been introduced for this purpose (6 + or - 1, 12 + or - 1, 24 + 2 or - 1 months). In addition, "maneuver" within the limits of a 30-day period is possible. The former system of performing periodic inspections according to flying hours logged imposed more rigid limitations in this regard. The spread of the calendar period of aircraft operation between inspections (for example, 8-15 months for 100-hour inspections) is now being replaced by a spread of flying hours logged between inspections (50-150 hours for 12-month inspections).

When a fixed-wing or rotary-wing aircraft comes to the technical maintenance unit under the new system, one should always note the number of flying hours logged in the period between inspections, since a certain number of aircraft equipment failures is determined by total time in operation, by physical wear on movable joints and connections, and by loss of operating properties by seals and other components.

The transition to the new system of performance of routine inspection and maintenance which is currently in progress is opening up to the aviation engineer service considerable possibilities for further increasing the efficiency of operation and maintenance of modern aircraft systems.

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CSO: 9144/234

AIRFIELD MAINTENANCE AND FLIGHT OPERATIONS SAFETY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 36-37

[Article, published under the heading "Innovations in Airfield Maintenance," by Col G. Bobrov: "In the Interest of Flight Safety"]

[Text] Provision of modern fixed-wing and rotary-wing aircraft to aviation units has required that aviation rear services personnel devote even more attention to ensuring high-quality maintenance of airfields, and this is not mere happenstance. As new-generation aircraft systems have come into service, there has been a substantial increase in the effect of static and dynamic loads on airfield surfaces. Other factors also come into play: vacuum effect, gas-stream pressures, temperature gradients, etc.

This is why the problem of high-quality maintenance of airfield surfaces in order to ensure safe operations to modern fixed-wing and rotary-wing aircraft is today taking on particular relevance. From this follows the conclusion that it is important to take preventive measures promptly to discover and correct defects and to repair airfield surfaces. These measures are clearly spelled out in the appropriate guideline documents, which contain instructions on preparing runways and taxiways for flight operations, organization of monitoring and inspection of the condition of airfield surfaces, with specification of the duties of aviation unit persons in authority pertaining to ensuring that airfields are in a continuous state of readiness. Regulations also prescribe scheduled allocation at every airfield of the necessary time to perform the most labor-intensive jobs pertaining to repairing artificial surfaces (moving of subsided slabs with bed repair, replacement of broken slabs, and repair of slabs with large split pieces).

In the course of flight operations the condition of the airfield is inspected and evaluated visually by the flight operations officer, his assistant, as well as the flight line detail. Aircrews which are taxiing, taking off and landing also continuously report on the condition of the airfield surface. In addition, the runway is inspected at least once during each flight operations shift. When flight operations are being run in two shifts, a specific time (determined by the commanding officer) is designated in the intervals between shifts to sweep and additionally inspect artificial surfaces, safety strips, and to inspect functioning of runway arresting gear (ATU).

Certain incidents eloquently indicate the results of failing to observe these rules and regulations. At a certain airfield, at which officer V. Bezgachev served until recently, they neglected maintenance procedures ensuring that artificial surfaces were kept in good condition. Negligence by maintenance personnel resulted in the removal of several engines from aircraft over a period of 6 months due to foreign objects entering air intakes. Engine breakdowns occurred for the same reason in the subunits in which officers I. Zharnosek and I. Dmitriyenko serve. And at the airfield at which officer M. Mikhaylik is responsible for airfield condition, commencement of flight operations was delayed on three occasions over the course of several months, and there occurred early removal of an engine from one of the aircraft.

The situation is totally different wherever commanders of aviation and aviation technical units, in scheduling flight operations shifts, prescribe nonflying days for performance of airfield preventive maintenance and repairs. Personnel prepare equipment, tools, and the requisite materials in advance for this purpose. Experienced methods specialists hold training classes with aviation personnel. It is not surprising that in the outfits in which officers I. Legotskiy, A. Podchasov, O. Agayev, and V. Suchok serve, for many years now there have been no potential aircraft mishap situations connected with the condition of airfield surfaces. The experience and know-how of these and other aviation units should be adopted by all Air Forces outfits operating modern aircraft systems. Here is an example of this know-how.

As we know, the slab joint is the most vulnerable point in an artificial airfield surface. The condition of a runway depends in large measure on the quality of joint repair and maintenance. In order to ensure a reliable joint, one that does not break down and litter the surface with debris, proper procedures of repair and filling should be observed to the letter. This is the case in the above-mentioned units. Prior to filling, joints are thoroughly cleaned, dried, blown with compressed air, treated with a primer (a 50-percent solution of asphalt or mastic in gasoline) and, finally, filled in two steps. RBV-25 and RBV-50 (rubberized plastic) special rubber-asphalt mastics are used to improve the joint seal; these compounds contain shaved rubber, benzofuran resin, and synthetic softening agents, in addition to asphalt.

The mastics are heated to a temperature of 180-200 degrees Celsius in special melting units. Total heating time should not exceed 4 hours. The heated mastic is applied within a period of two hours, which ensures that all components maintain their properties, ensures a good-quality joint and economical consumption of short-supply materials.

We should now like to discuss another, no less important matter. Tougher demands on maintaining airfield surfaces in connection with operation of third and fourth-generation aircraft have made it necessary for aviation rear services personnel to master new, high-output airfield maintenance equipment used to care for the airfield and ready it for flight operations in all weather and climatic conditions. New maintenance and repair materials have been developed and are being successfully utilized, and existing materials are being improved.

Higher-output and improved-design snow removal vehicles, for example, have produced good results in experimental tests. Their output is half again as much as vehicles currently in use. The matter of providing vehicle operators with greater working comfort has also been resolved, applying the latest scientific and technological advances. A new heating unit to melt runway ice went into regular production last year, and a self-propelled airfield surface joint-filling machine has completed plant testing. It will simultaneously clean out, prepare, and fill joints.

A special impregnating compound has begun to be widely used on Air Forces airfields to strengthen the concrete surface layer. It is based on styrene-indene resin (SIS), obtained from residues from the fractional distillation of raw gasoline and pyrolysis resin. The preparation is a crystalline substance with unlimited shelf life and is manufactured in the form of granules and flakes up to 3 mm thick.

For protective treatment (impregnation) of airfield surfaces SIS is applied in the form of 20-30 percent solutions in low-viscosity organic solvents (xylene, toluene, paint thinner). One can use a mixture of toluene or xylene with kerosene in a ratio of 3 to 1. The impregnation compound is spread over the concrete surface. After it is absorbed into the concrete, the solvent rapidly evaporates and the resin passes into the solid state and seals pores and microflaws in the surface layer.

These solutions are prepared in the tanks of fuel trucks, KPM-64 and AKPM-3 vehicles, as well as in various metal containers. The impregnation solution is applied to the concrete surface with the aid of marker vehicles or trucks fitted with spray devices. Two coatings are applied to the surface, waiting at least 2 hours between applications.

In order to let the protective layer properly cure, the surface should not be used for 48 hours after impregnation. Depending on the porosity of the surface layer of concrete, total consumption of impregnation compound ranges from 200 to 400 grams per square meter. The surface is recoated every 2-3 years, depending on whether the previous application is still effective.

Tests of this compound at a number of locations have shown it to be highly effective in protecting concrete surfaces against the destructive effect of water during fluctuating air temperatures in the fall, winter, and spring. In addition, SIS resin, closing pores and microcracks in the concrete, substantially reduces ice adhesion to the surface during icing conditions, which shortens the time required to ready airfields for flight operations.

Various compounds based on synthetic materials have recently been extensively utilized in airfield maintenance to repair the upper, disintegrated layer of concrete surfaces. They harden rapidly in all temperature and climatic conditions, bond well with the concrete surface, possess high strength, and have low susceptibility to the majority of acids, alkalis, and solvents.

For example, epoxy resin compounds are employed to produce a "carpet" on areas of concrete with exfoliated and crumpled top layer, for filling in cracks,

potholes, and repairing chipped edges, as well as to prepare a binding material to bond freshly-laid concrete to old concrete. Mixing such a bonding material with sand or finely crushed rock produces various polymeric solutions or mixtures. They are employed in repairing minor chip damage along slab edges, as well as to form a "carpet" of required thickness on the concrete surface.

Fast-setting concretes based on portland and alumina cement are also employed in repairing cement-concrete surfaces.

Polyester glue can also be used to bind repair materials to concrete. It is based on PN-1 unsaturated polyester resin.

Experience in employing new materials based on synthetic resins has confirmed that they possess a number of features: they are of a complex chemical nature, have a limited useful life and shelf life, and require rigorous observance of specified dosages, clean and dry inert materials. These features should be borne in mind.

Ice can form on artificial airfield surfaces when temperatures are fluctuating back and forth through the freezing point; ice sharply reduces hold between aircraft wheel and surface. Therefore combating ice on runways, taxiways, and flight lines is one of the most important means of ensuring flight operations safety in winter.

Melting runway ice with heat is extensively employed at Air Forces airfields. Although quite reliable, it is a very laborious and uneconomical method, requiring large quantities of aviation fuel and heavy use of ice melting trucks.

The chemical method of combating icing, using the chemical reagent ANS, has become increasingly accepted in recent years. The commercially-manufactured reagent is not entirely to the liking of the maintenance people, however, due to its hygroscopicity, its tendency to cake, and the fact that it aggressively attacks freshly-laid concrete. Improvement of this reagent and the development of new chemical preparations was called for. NKMM, NMK-2, and ANS-2 chemical reagents are presently becoming available.

An important role in flight operations safety is played by runway arresting gear (ATU), which is designed to arrest aircraft overrunning the runway on their landing roll or on an aborted takeoff. Twenty years of experience in the use of ATU has shown that it is highly reliable. Of the several hundred times arresting gear has been utilized during this time, in all cases the lives of the aircrews were saved, and the aircraft received only minor damage.

Up to the present time industry has manufactured arresting gear designed to stop aircraft weighing up to 20 tons. But a new class of arresting gear has successfully completed testing, designed for aircraft weighing up to 45 tons, and regular manufacture has begun. An urgent task at the present time is that of accomplishing rapid installation of this new gear and organizing efficient operation and maintenance.

Winter, the most critical period in airfield operation and maintenance, has set in. Winter tests the preparedness not only of equipment but also of commanders and all personnel. Incorrectly organized airfield maintenance during the period of fluctuating temperatures can result in irreparable damage to artificial airfield surfaces.

Aviation rear services specialist personnel work with the most advanced equipment, which is swiftly evolving year by year. It is their primary task to use this equipment efficiently, skillfully, and innovatively. This is a demand of the times. It is demanded in the interests of combat readiness and flight operations safety.

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HISTORY OF COSMONAUT TRAINING CENTER OUTLINED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 38-39

[Article, published under the heading "Star City Then and Now," by AVIATSIYA I KOSMONAVTIKA correspondents, in interview format: "Birth of the Cosmonaut Training Center"; first part of a multipart article]

[Text] Correspondents of this journal met with Ye. Karpov, head of the Cosmonaut Training Center (TsPK), his deputy Ye. Cherkassov, twice Heroes of the Soviet Union Pilot-Cosmonauts USSR Maj Gens Avn P. Popovich and A. Leonov, former aviation unit commander Test Pilot 1st Class, Honored Military Pilot USSR Col (Ret) M. Lavrov, and engineer I. Tyavin. We publish below their remarks during these interviews.

(Ye. Karpov): In February 1960 I was officially assigned to head the Cosmonaut Training Center, although I had already previously worked with various matters pertaining to its organization. Therefore I had a general idea of what kind of burden I was accepting. There were three tasks to be accomplished simultaneously: establishing the Center (recruiting staff, construction, and supply), forming the first training facilities, utilizing the experience of the Soviet schools, and particularly practical experience in training pilots, and setting up a regular training process for the first group of cosmonauts.

We viewed all training as an extensive aggregate of measures of a medical-biological, technical, and flight training character. We began selecting personnel to run the training program. A. Vlasyuk, F. Demchuk, V. Kutilin, and others were among the first to arrive at the Center.

Our principal task was to prepare people to live and work in space. The medical personnel and other specialists were to guarantee first and foremost a perfect state of health and psychophysiological readiness on the part of the cosmonaut who on the first manned mission would be instructed to observe, evaluate, compare, and commit to memory events in an as yet little-studied environment.

How were training activities organized? Lectures were combined with intensive physical training and toughening, parachute jumping, experimental introductory

"ascents" in the altitude chamber, tests in controlled-temperature rooms, investigations conducted in the quiet room ("tower of silence"), ejection on a ground installation, vestibular studies and training drills, sessions on the centrifuge, and introductory flights with a brief period of weightlessness on board a specially equipped aircraft. Thorough medical examinations would be given before and after practice sessions and tests, and more detailed clinical-physiological examinations would be given periodically. This made it possible with some approximation to recreate in laboratory conditions and to apply in fairly accurate doses many of the anticipated factors encountered in space flight.

At the same time the cosmonauts were receiving theoretical training in celestial mechanics and rocketry. It was necessary to teach them to respond intelligently in unusual situations and in particular to accomplish the descent from orbit manually if it became necessary.

In time the general thrust of activities at the future Cosmonaut Training Center began to flesh out: scientific support of the training programs, organization of study and training activities, in which at that time nobody was engaged. Of course a great many questions arose. What kind of equipment would have to be installed in the laboratory buildings? Should it be installed piecemeal or as a complete package? What housing should be built and where? Plus many other items.

There were plenty of difficulties at that time. A large percentage of them were connected with a shortage of apparatus and equipment required for our work, because some instruments and equipment did not yet exist at the time. For example, a Vostok spacecraft simulator. And yet it was an essential piece of equipment.

Sergey Pavlovich Korolev helped solve this problem. At one of the organizations where part of the Vostok cockpit equipment was built, they built a simulator based on an existing simulation test bed, providing exterior simulation (crossing the terminator, the Earth's "run," etc). This work was done by a team of engineers which was working on final refinement of the spacecraft control system.

Simulator training methods were devised. They were based on running through a cosmonaut's mission procedures sequence from launch to landing, both under conditions of a normal mission and in all emergency situations, that is, deviations from the mission program. A debate which was typical of that time took place during discussion of the first program and method of simulator training.

"Why concentrate a cosmonaut's attention on manual descent of the spacecraft from orbit? After all, the Vostok will be controlled automatically," asserted some specialists.

"No," retorted the authors of the program. "The experience of test pilots tells us that it is necessary to study possible complications in advance, to prepare a future cosmonaut in advance psychologically for emergency situations, in order not to have to search for the correct decisions later."

Organization director N. Stroyev, who gave approval of the proposed method, noted that automatic control systems can fail, and only a well-trained individual will be able to complete the mission safely. Hero of the Soviet Union Honored Test Pilot USSR M. Gallay became the first cosmonaut instructor. Specialists Ye. Tselikin, I. Vashchenko, and others were subsequently added. Later they also organized simulator training here at Zvezdnyy.

Direct intercommunication with the Chief Designer was definitely a bright event in the life and activities of the future cosmonauts. Sergey Pavlovich repeatedly talked with the cosmonauts about space missions, future prospects for space flights, and shared his thoughts about the future. He carefully studied the young pilots and evaluated each of them. Korolev advocated including in the cosmonaut training program aircraft flying and parachute jumping. "I am convinced," he stated, "that they not only hone useful pilot flying skills but also contain a strong charge of emotional-volitional energy which the cosmonaut needs."

An important role in cosmonaut training was assigned to their moral-psychological readiness to fly a forthcoming mission, although there was no special segment of the training program under this designation. A cosmonaut can develop in himself an appropriate "charge" for a mission only in the process of practical activities. Therefore this goal figured prominently in all the sections of the training program.

In January 1961 a special board, which included prominent scientists, design engineers and physicians, tested the "vanguard six" on their knowledge of the Vostok spacecraft and their ability to handle it and make independent decisions if any system failed. The first examination for the title of cosmonaut in the history of mankind was given on the simulator.

(P. Popovich): One day in March 1960 I came to Moscow on travel orders and found the building I was looking for, where the Cosmonaut Training Center was supposed to be housed. I introduced myself to Yevgeniy Anatol'yevich Karpov. After a brief chat he said to me: "You can be the welcoming committee for your comrades. You can assume the function of quartermaster."

It seems I was the first arrival. There was as yet no group or cosmonaut corps. For 3 days I was the sole cosmonaut candidate. On Monday I played the role of gracious host and greeted Yuriy Gagarin, German Titov, Valeriy Bykovskiy, Vladimir Komarov, Andriyan Nikolayev, Aleksey Leonov, Boris Volynov, Georgiy Shonin, Viktor Gorbatko, and others. I helped my comrades settle in. We then set to work: we installed equipment in the classrooms and set up instrumentation. We quickly became good friends.

As the senior man in the group, I called the first party meeting to order. The party members spoke in an enthusiastic and businesslike manner, making suggestions on how better to organize training classes and daily off-duty routine.

I was elected detachment party organization secretary. At first there were many difficulties, and this was natural, for prior to us no party organization

had ever dealt so directly with problems of training for manned space missions, with the daily life and training of those who would be assaulting the universe. It immediately became a tradition with us to speak the truth to one another honestly and candidly.

Komsomol affairs were handled by German Titov and Valeriy Bykovskiy, and later by Valentina Tereshkova as well. There was not a single person in the detachment who was not carrying out a party or Komsomol assignment. But perhaps the most active was Aleksey Leonov, our regular editor of the satirical newspaper NEPTUN. None of us recalls NEPTUN ever coming out late for any reason. It kept constant company with the detachment during large activities and small. It was with us in the gymnasium, during parachute jumping, in the classrooms, in the laboratories, at the plant, and in the quiet room. Take, for example, the drawing "Convict Escort": an unshaven person is seated in an open jeep. A doctor is sitting alongside him. A woman standing by the road is staring in amazement: this is the way they haul a prisoner. But it is German Titov, who has just finished a session in the quiet room. In April our detachment proceeded to the banks of the Volga, where each of us was to make up to 50 parachute jumps of varying difficulty -- normal and delayed-opening, day and night, in good weather and bad, onto ground, water, forest or swamp. Parachute training was supervised by a real expert -- repeated world record holder Nikolay Konstantinovich Nikitin.

"I shall teach you to jump," he said. "Everything will go just fine."

Back in my regiment I had made six jumps. Essentially I was starting right back at the beginning. I recall an incident from those days.

I was jumping third. At first everything went fine. I landed in the target circle and collapsed my canopy. I then released the snap links, removed the harness straps, wound one of them on my arm, and stood with one foot on the suspension lines.... But the canopy suddenly again "came alive," filled, and dragged me along the ground. My arm, caught in the strap, yanked hard and gave a crunching sound. A sharp pain shot through my body. I succeeded in collapsing the chute with effort, folded it up and carried it to the truck.

The group continued jumping, while I strolled about the airfield with a bound arm. Nikolay Konstantinovich sensed my mood. Two days later he came up to me and said hello, shaking my hand on the hurt arm.

"Does it hurt?"

"Not too bad."

"Then get a parachute and report to the truck."

I went aloft, took my place in the doorway, and couldn't believe it: my entire body was trembling. The instructor, usually impatient and quick-tempered, this time was very restrained and even sympathetic -- he placed his hand on my shoulder, and I heard him say: "Don't drift, Pasha."

My nervousness disappeared instantly. Pushing off slightly, I plummeted toward the yellow-brown steppe.

After two jumps Nikolay Konstantinovich gave me a thumbs up gesture. This was the instructor's highest praise. Later the jumps became more difficult.

After making from 10 to 15 jumps, we became quite fond of this sport. I can still see Leonov: we were on our knees before Nikitin, begging permission to take one more jump. By a month and a half later, each of us had made 40 jumps. We returned to Moscow in May. Regular training commenced.

At first our basic training activities were organized according to the medical preparation schedule. I remember interesting lectures by Grigoriy Fedulovich Khlebnikov and Oleg Georgiyevich Gazeiko. We also studied astronomy, flight dynamics and navigation.

In July we moved out into Moscow Oblast, closer to the Cosmonaut Training Center, which was under construction. At that time there was a two-story building on the site of the future Zvezdnyy.

It took time to build the physical facilities. Therefore at first space technology classes and training activities were held at institutes, design offices, and at industrial plants. At Zvezdnyy we had a Khilov swing, treadmill, spinning chairs, and dynamic floors. An altitude chamber and quiet room were also used in training. I remember how some of us were afraid of the quiet room [surdokamera] (it was also called the chamber of silence [kamera tishiny]). Imagine yourself in a small room measuring three to four paces from wall to wall. The heavy door has closed behind you. No sounds penetrate into the room, and you see no other human being. I felt right at home in the quiet room, however. I would begin physical training early in the morning: running, jumping, performing various exercises. I would give myself orders, and would keep track of the time. Then I would say: "Let's have breakfast...." I would begin the day with confidence. During free hours I would sing arias from operas and operettas, folk songs, and read. First specialized books -- on cybernetics, astronomy, physiology. When I would become tired, I would say to myself: "That's enough." And I would begin reading Mayakovskiy and Yesenin. I came out of the quiet room with a beard.

During those first years most of the training apparatus and equipment was borrowed from aviation, from training practices used to prepare flight personnel for high-altitude flying. This equipment definitely played a significant role. Facilities are much more complex today. Training methods have also changed. Certain types of training activities proved to be too intensive, or even superfluous. They were replaced by others, more essential and relevant, and producing more results.

At the end of the summer our detachment was divided into two groups. The first one, of which I was a member, became the lead element, as it were. They tested and perfected training equipment on us, and we were the first to be tested in the quiet room, on the centrifuge and vibration table, and the first

to eject. In brief, our group was intensively tested for endurance or, as Yuriy Gagarin aptly put it, for strength. (To be continued)

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CSO: 9144/234

SCIENTIFIC OBSERVATION OF OCEAN SURFACE FROM ORBIT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) p 40

[Article, published under the heading "The Space Program Serving Science and the Economy," by V. Isakov: "Appearance of the Ocean From Space"]

[Text] Utilization of the resources of the World Ocean is one of the important tasks specified by party and government program documents for the immediate future. One of the areas of emphasis in accomplishing this task is the creation of a permanently-operating system of collection and processing of global oceanographic data. Such a system, which is being established in the USSR, includes Salyut manned orbital stations, specialized Kosmos oceanographic satellites and Meteor automated weather satellites, as well as ocean ranges and a ground data receiving and processing network.

Putting such systems into operation is preceded by elaboration of a broad range of methodological questions pertaining to obtaining and interpreting oceanographic information, designing, building and testing specialized spaceborne and ground hardware, and compilation of records of standard data.

Space hardware which provides the capability to observe large areas of ocean enables us to investigate on a global scale the processes developing within the ocean. Recently there has been heightened interest in the coloration of the sea. What is the reason for this interest? Scientists presently believe that sea coloration can be used to detect biologically productive areas of ocean and to estimate the character of pollution of the water surface. For this reason work on determination of the background color characteristics for certain areas of the Pacific and Atlantic oceans, performed by cosmonauts on board Salyut 7, is of particular significance. Utilizing the ATs-1000 atlas of standard colors, they determined the color of the water at the nadir, when the light flux reflected from the ocean surface was close to zero and, consequently, was affected solely by internal light. The color of water depends to a considerable degree on the quantity of suspended organic and mineral matter. The purer water is, the darker-blue its background. Observed phenomena are in complete agreement with the data of oceanographers, who over a period of many years collected data on the ocean obtained by individual, separate expeditions. It is therefore becoming obvious that study of the

optical characteristics of seawater from an orbital vehicle is not only of theoretical but practical significance as well.

Another important directional thrust of investigation of the ocean with the aid of satellite systems and Salyut manned orbital stations is study of the dynamics of the waters of the World Ocean on the basis of its specific manifestations on the ocean surface. We have already stated that there exists a relationship between water color and the content of nutrients in that water. It is erroneous to assume, however, that identification of such a complex feature can be accomplished solely from the single indirect indication of color. Additional information is needed. Only cosmonauts are capable of obtaining such information. And they do this on every mission. On 1 November 1982, for example, A. Berezovoy, making observations from Salyut 7, noted in a zone of upwelling of deep waters, in the area of the patch of reflected sunlight from the ocean surface, vortex features with a characteristic twist in different directions in relation to its central part.

Strange as it may seem, in a number of instances cloud cover assists cosmonauts in studying the dynamics of the waters of the World Ocean. In particular, the crew consisting of L. Kizim, V. Solov'yev, and O. At'kov confirmed repeatedly that the boundary of cloud cover corresponds to vortices, while cyclonic vortices, in which upwelling of deep waters takes place, are observed in gaps in solid cloud cover. Why does this happen? These phenomena are explained as follows. Solid low cloud cover forms over a relatively warm water mass, characterized by elevated evaporation of moisture, while cloud cover is diminished or entirely lacking above a colder water mass.

It was precisely observations from space which showed that cloud type, form, levels of occurrence, texture, and image tone help define and trace hydrosphere fronts. In particular, the crew consisting of L. Kizim, V. Solov'yev, and O. At'kov detected the Labrador and North Pacific currents in this manner. In the former instance the current was identified in the form of a river 50-70 kilometers wide, along the "banks" of which solid stratus cloud cover ran, and in the latter -- by a sharp boundary of a mass of stratocumulus cloud cover, which served as an indicator of a hydrosphere front. We must note, however, that this method has a number of limitations, imposed by differences in the underlying surface and the formation of cloud cover.

There is another interesting detail. Dynamic processes in the ocean surface layer, including currents, can be clearly observed in the zone of the patch of reflected sunlight or, as they say, the sun track. Since from an altitude of 350 km the area of the sun track, depending on the sun's height above the horizon and the state of the ocean surface, may exceed 15,000 sq km, such cosmonaut observations are of considerable interest from the standpoint of simultaneous monitoring of water dynamics over large areas. The "visibility" effect is due to modulation of wind-driven waves in the field of currents, creating brightness contrasts on the water surface. Precisely this enabled A. Berezovoy to observe the Falkland current on 28 September 1982 and to observe westerly winds in the vicinity of Crozet Island [sic].

Observations from Salyut 7 of hydrophysical phenomena in the zone of the solar reflection patch are unquestionably important and will help in developing future methods of studying the ocean from unmanned orbital vehicles.

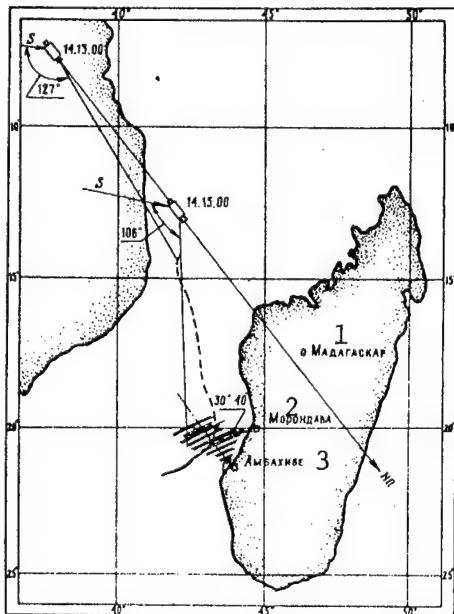


Diagram from A. Berezovoy's flight log

Key: 1. Madagascar; 2. Morondava; 3. Ambahibe [sic]

But is observation of front interfaces of water masses possible outside the zone of the patch of reflecting sunlight? Experts believe that under certain conditions of observation, cosmonauts are capable of recording certain phenomena. This can be confirmed only by experiments, however. One such experiment was conducted on 28 September 1982 by cosmonauts A. Berezovoy and V. Lebedev. The drawing reproduced from A. Berezovoy's flight log indicates that observation of front interfaces between water masses (wavy line) and internal waves (arcs) is possible at viewing angles of approximately 60 degrees outside the zone of reflected sunpatch as well.

Only the first steps have been taken in studying the World Ocean with the aid of orbital stations. Ahead lies improvement of methods and programs of investigation, sensing and recording equipment for accomplishing tasks for the benefit of the economy and study of the environment.

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CSO: 9144/234

INTERNATIONAL SATELLITE SEARCH AND RESCUE SYSTEM

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) p 41

[Article, published under the heading "International Cooperation," by Col A. Yeritsyan: "Space Rescuer"; based on materials published in the foreign press]

[Text] Statistics from Lloyd's Register of Shipping indicate that each year approximately 350 vessels go down in the waters of the World Ocean. There also occur a great number of aircraft in-flight emergencies and crashes, with aircraft frequently flying over desert and sparsely populated regions. An aircrew which has made a forced landing in such an area needs the assistance of rescuers just as shipwrecked sailors do.

In a number of instances the problem of discovering vehicles in distress today is solved with the aid of satellites and special radio beacons and buoys carried on board airplanes (helicopters) and vessels, devices which continue to operate after a crash.

Development of a satellite search and rescue system is being carried out at the initiative and with the active participation of the Soviet Union, which consistently implements a policy of peaceful utilization of space hardware. Pursuant to an international agreement, work is proceeding in parallel in the USSR on the one hand and in the United States, France, and Canada on the other.

Our country has developed the KOSPAS system, while the United States, France, and Canada have developed the joint SARSAT project. In the Soviet Union work is coordinated by the USSR Ministry of Maritime Fleet, with the participation of the Ministry of Civil Aviation, while efforts in the United States are directed by the National Aeronautics and Space Administration (NASA).

Both systems can operate independently of one another as well as together. The system's search principle is based on measuring the Doppler frequency shift of a distress signal sent by special radio beacons and buoys and on determination of the position coordinates of the craft in distress from the magnitude of this shift.

The satellite rescue system at the current experimental stage is based on four satellites (two Soviet and two American), specially launched into polar orbits at an altitude of 800-1,000 km. The Soviet Union is using the Kosmos-1000 series satellite, and the United States -- the Tiros H weather satellite. The satellites carry relay gear, receiving and storage devices, Doppler frequency measuring devices, and highly-efficient receiving and transmitting antennas. The satellites pick up distress signals at frequencies of 121.5, 243, and 406.025 MHz. The latter frequency provides the capability to determine the position coordinates of an emergency locator beacon at any point on earth, and the first two -- only in the reception zone of ground stations. Ground data receiving stations (PPI) are located on the territory of the USSR (Moscow, Arkhangelsk, Vladivostok, and Novosibirsk), the United States (San Francisco, Saint Louis, (Kodiak)[?]), Canada (Ottawa) and France (Toulouse). A station has also been established in Norway, at Tromso.

Data from the satellites is processed at the ground stations and transmitted to the national vessel and aircraft satellite rescue system centers.

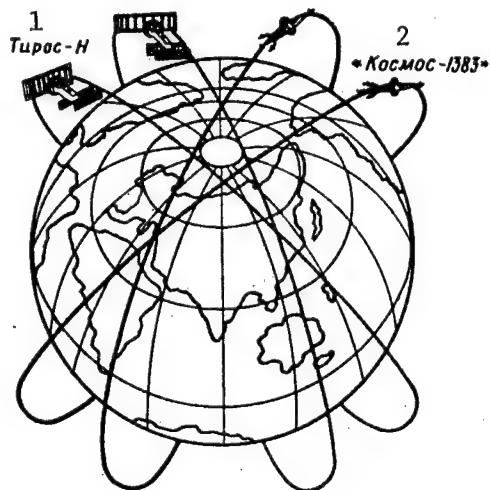
The KOSPAS and SARSAT national centers receive data coming in from their ground stations on aircraft and vessels in distress, redistribute the information among the search and rescue services of their own country and other countries, exchange satellite ballistic data, and transmit it to the ground stations.

Emergency locator beacons and buoys are presently being developed specifically for vessels, airplanes, and helicopters. They should switch on automatically and have the capability to operate after a crash.

At the frequency 406.025 MHz the duration of signal radiation is 0.44 seconds, repeated each minute. Radiated power is 5 watts. The radio beacon has the capability to transmit data on the nationality of the vessel or craft and its type with a specially designated code. At the present time, according to the agreement, Soviet vessels and aircraft will emit code 221, American -- 111, French -- 211, and Canadian -- 121. Crash data will be redistributed among the participating countries on the basis of these indicators. There is also a possibility of encoding a vessel or aircraft's domestic governmental or company affiliation.

The radio beacon, in addition to a transmitter operating at a frequency of 406.025 MHz, carries a 15 milliwatt transmitter operating at a frequency of 121.5 MHz to guide search planes and helicopters to the crash site. This transmitter has an effective range of up to 20 km. Accuracy of determination of position coordinates with the aid of the satellite system and emergency radios and crash locator beacons operating at frequencies of 121.5 and 243 MHz (R-855UM, Komar, Avariya, and counterpart equipment in the other countries) ranges between 10 and 20 km.

It takes about 25-30 minutes to process distress signals and to determine their source. A single satellite covers a strip of about 4,000 km. Time to detection of a distress signal under the most adverse conditions of mutual position of satellite, ground station, and crash locator beacon does not exceed one and a half hours.



Mutual Positioning of Satellite Orbits and Parameters:

	Kosmos 1000	Tiros H
Circular polar orbit, altitude, km	1000	850
Inclination, degrees	82	98
Revolution, min	105	102
Number of revolutions per day	14	14
Mass of vehicle in orbit, kg	810	420

Key: 1. Tiros H; 2. Kosmos 1383

Effectiveness of utilization of the global satellite search system depends on many factors, including radio transmission discipline. It is essential to prohibit in all areas and localities transmission at frequencies of 121.5, 243, and 406.025 MHz not connected with distress signals. It is extremely important to hasten the development and installation on vessels and aircraft of automatic radio beacons and buoys capable of operating for an extended period of time, and to bring on-line as rapidly as possible all planned ground data receiving stations.

The program for testing the KOSPAS-SARSAT system, which is presently being carried out, prescribes comprehensive system testing and verification. When the system is approved for full-scale use, one more duty will be added to the satellite's numerous tasks, perhaps the most humane and noble duty -- protecting human life.

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CSO: 9144/234

OVERVIEW OF CURRENT STATUS OF APPLIED SPACE TECHNOLOGY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 44-45

[Article, published under the heading "The Space Program Serving Science and the Economy," by M. Aleksandrov: "Space -- Arena of Man's Activity"; concluding part of two-part article; first part appeared in No 12, 1984]

[Text] Utilization of orbital vehicles to observe the Earth proves highly effective. Just warning of the outbreak of forest fires in the United States, for example, produces annual savings of up to 15 million dollars. Satellite-borne equipment helps geologists plot maps of geologic structures and helps commercial fishermen find biopродuctive areas in the World Ocean. Grain crop yield forecasting with the aid of satellites is today a routine activity.

Observation of the Earth from space can also be used for many other purposes: to monitor the integrity of gas and oil pipelines, land management, performance of agricultural work, and to determine damage from natural disasters over large areas.

Scientists foresee many new developments in utilization of orbital vehicles for Earth observation. There are plans for establishing a global automated system of recording and monitoring the state of Earth resources, and for expanding the capabilities of orbital vehicles with the combined utilization of scientific equipment. For example, combined utilization of electro-optical and radar equipment will make it possible to obtain images of the Earth's surface across a broader band of frequencies. This will expand possibilities of using satellites to prospect for minerals, to detect environmental pollution, for forestry management, and for crop forecasting.

With the aid of orbital vehicles it has also become possible to perform geodetic tasks and tasks pertaining to mapping difficult-access areas which had never been accomplished and could not be accomplished by other means.

Human habitation of space has begun. The duration of Soviet manned missions is steadily increasing. The 211 days spent in space by A. Berezovoy and V. Lebedev is not the upper limit. In two missions V. Ryumin has spent a total of approximately a year in space. While the first spacewalk, by A. Leonov, lasted only 22 minutes, the crew of the Salyut 7 station -- L. Kizim, V.

Solov'yev, and O. At'kov -- logged six EVAs totaling 22 hours 50 minutes during their 237-day mission, which is the record to date. EVA activities included a highly complicated series of installation operations on the station propulsion unit, as well as the deployment of two additional solar panels. Two similar additional solar panels had been deployed by the station's preceding crew -- V. Lyakhov and A. Aleksandrov.

It is now clear that man can perform fairly delicate installation operations in space. Man's role in space will steadily grow and, just as with exploration of the North Pole and Antarctica, will lead to the establishment of permanent station bases in space and the establishment of a system of such bases, entire colonies, and specialized facilities for servicing these colonies.

Mankind is also commencing to develop activities in another area -- utilization of specific factors of space.

In order to obtain a high-quality weld, melt, soldered or brazed joint in terrestrial conditions, we are presently forced to employ special vacuum chambers. But this involves a number of fundamental technical difficulties, and it is not possible to obtain ultrapure materials of the required quality. The space environment offers ideal conditions for such operations. In space one can produce unique metals, grow ultrapure crystals for electronics and optics, produce extremely rare medical preparations, etc.

Weightlessness helps produce molecular compounds of organic substances which open up the way toward obtaining new drugs and new organic fibers.

Soviet cosmonauts have performed a large volume of experimental work in the area of space technology and materials science. Experiments performed back in 1969 by Cosmonauts G. Shonin and V. Kubasov on welding metals in space, as well as other experiments on Splav, Kristall, and Isparitel' units pertaining to melting metals, growing single crystals, producing magnetostable materials, and repairing coatings, plus the most recent EVA experiments performed by V. Dzhanibekov and S. Savitskaya on welding, cutting, soldering and brazing metals in open space opens up extensive opportunities for commencing commercial production in space.

Liquid mixtures or alloys of constituents with differing density do not separate in space. If in addition to this one can learn to regulate the size and distribution of gas bubbles in mixtures, one can even obtain such materials as foamed steel, heavy foamed metals, and glass foam with prescribed density, transparency, and thermal conductivity. Such materials can find extensive application in industry and can be utilized in assembling various large structures in space.

In short, man is undertaking initial attempts to adapt the highly specific factors and properties of space for his own industrial purposes.

And finally, a few words about a third area. Already today, with the aid of solar panels, we are utilizing the sun's energy to provide power to such large stations as Salyut. And of course the day will come when man learns to

control the fluxes of solar energy passing through near-Earth space and to direct them to Earth. He will be able to utilize this energy to perform all his production tasks as well as tasks such as night illumination of cities, highways, natural disaster areas, and the Arctic regions in winter. Scientists propose to place in a geostationary orbit an entire structure capable of reflecting sunlight onto the night side of the Earth. This will require large mirror surfaces, up to several hundred meters in diameter, of metal-coated sheets of plastic or film. Such a structure can illuminate an area equal in size to the city of Moscow. By assembling in orbit structures of various configuration and appropriately aiming them, we can illuminate areas of interest to us.

Also being considered is the possibility of utilizing superhigh-frequency electromagnetic oscillations to transmit to Earth energy produced in space. A power generating plant could be deployed in space, on a space vehicle, or on one of the planets. In the first instance it would comprise a space vehicle equipped with appropriate instrumentation and a transmission system. If a power generating plant is placed on one of the planets, a space vehicle would serve as a device to relay energy from the point of production to the end consumers. This idea has not yet reached practical embodiment, however, due to the poor efficiency of the proposed designs.

Utilization of lasers capable of concentrating energy in a high-density beam opens up extensive possibilities in the area of wireless energy transmission, which promises a revolution in this field.

In certain instances it may also prove possible to utilize the solar wind for purposes of space travel. Perhaps in the not too distant future small interplanetary craft will be able to travel in space great interplanetary and possibly also interstellar distances under a large sail of thin plastic, covered with a shiny aluminum film, propelled by the solar wind.

We could continue the list of examples of utilization of space technology for the benefit of mankind. Even the fullest enumeration, however, would be unable to encompass all the areas of man's activity in space or to predict the true value of practical exploitation of space. This is why I should like to end this small excursus into future activities pertaining to the peaceful exploitation of space with a statement by K. E. Tsiolkovskiy: "Presently man is weak, but he is transforming the surface of the Earth. Millions of years hence men's power will increase to the extent that they will alter the surface of the Earth, its ocean, atmosphere, plants, and themselves, and will control the climate -- man will be master of the solar system just as he is master of the Earth!"

There is every reason to state that these prophetic words will come true.

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CSO: 9144/234

WESTERN MILITARY TRANSPORT AIRCRAFT REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 85 (signed to press 4 Dec 84) pp 46-47

[Article, published under the heading "Abroad," by Col V. Kondrat'yev: "Military Transport Aircraft of the Capitalist Countries"; based on materials published in the foreign press]

[Text] In the view of foreign military experts, military transport aviation is an important means of supporting combat operations of ground troops, naval forces, and other air components. Transport fixed-wing and rotary-wing aircraft carry personnel and cargo, drop airborne assault forces, deliver supplies to designated areas, evacuate sick and wounded, and perform other missions. Proceeding from this, the air forces of the capitalist countries devote considerable attention to improving the fleet of transport aircraft, personnel proficiency, and organizational structure. The U.S. Defense Department considers this category of military aviation to be one of the principal means of achieving strategic mobility for the U.S. military, operational deployment of interventionist rapid deployment forces to any part of the world, and provision of logistic support to these forces.

As is reported in the Western press, the air forces of the NATO nations possess more than 1,800 military transport aircraft, almost 1,000 of which belong to the U.S. Air Force. The foreign press cites some of the performance characteristics of these aircraft.

The U.S. C-5A Galaxy heavy military jet transport (Photo 1) [photos not reproduced] was developed by Lockheed and built from 1969 to 1973. More than 80 units were produced.

This aircraft is a high-wing monoplane with swept wing and T-tail. The landing gear consists of four six-wheeled main-gear assemblies and a four-wheel nose gear, a total of 28 wheels with a pressure of 8.44 kg/sq cm in the nose wheels and 10.9 kg/sq cm in the main-gear wheels. The pilot can adjust tire pressure from the cockpit, based on aircraft load and runway surface.

The aircraft is powered by four TF39-GE-1 pylon-mounted turbofan engines. Each engine produces a maximum thrust of 18,600 kg. Capacity of internal fuel tanks -- 185,480 l. The aircraft is equipped for aerial refueling.

The fuselage is double-decked. The upper level contains the flight deck (5-man crew) and rest area for 15 persons (crew members and persons accompanying cargo). Passenger cabin accommodates 75 troops. The lower deck carries a cargo compartment, which can carry up to 270 troops or 120 tons of cargo. The compartments are pressurized and air-conditioned.

According to figures in the foreign press, maximum takeoff weight is 348.8 tons, empty weight -- 147.5 t, cruising speed 815-870 km/h, service ceiling 10,300 m (at an operating weight of 280 t). Maximum range without aerial refueling approximately 6,000 km carrying a load of 100 tons, 10,500 km carrying 50 tons. Ferry range 13,500 km. Aircraft length 75.54 m, height 19.85 m. Wingspan 67.88 m, wing area 576 sq m. Wheel track 11.22 m, wheelbase 22.33 m.

The transport can carry two M60 or Abrams tanks; one M60 tank and two UH-1 Iroquois helicopters; five M113 armored personnel carriers; 16 three quarter ton trucks; 36 463L standard load pallets.

Loading and off-loading can be performed from forward (visor-type upward-hinged nose) and aft (loading ramp and outward-hinged side panels), as well as door on side of fuselage.

Poor wing fatigue strength was discovered in the process of operation of this aircraft, which cut rated service life (30,000 hours) almost in half (more than fivefold by number of landings) and restricted maximum payload to 93 tons.

A new wing was designed to correct these deficiencies. According to U.S. experts, the new wing made it possible to boost load capacity by 9 tons, and with a decrease in operational load factor from 2.5 to 2 it was once again boosted to the original rated figure (120 tons). Fuel capacity was increased by 6 tons, new flight and navigation instrumentation was installed, and more powerful TF39-GE-1C engines were added, each with a thrust of 19,500 kg. Following these modifications, the aircraft was redesignated the C-5B.

The first C-5B was delivered to the U.S. Air Force in February 1982, and modification of the last aircraft in the fleet is scheduled for 1987. It is also planned to build an additional 50 of these aircraft from 1985 to 1989.

The U.S. C-141 Starlifter heavy jet military transport aircraft (Photo 2) was also developed by Lockheed. A total of 285 units were built. Between 1979 and 1982 all C-141A aircraft in the inventory (more than 270 units) were modernized, after which they were designated C-141B. The fuselage was improved by stretching 7.11 m. Improved wing root fairings were also added. The aircraft was equipped with an in-flight refueling system.

As a result the C-141B became 4.6 tons heavier, but its transport capabilities were increased by 35-40 percent over the C-141A, which enables it to carry large payloads without exceeding allowable load limits. In particular, it is reported that it can carry up to 13 463L standard load pallets (totaling up to

27 tons aggregate payload), while the C-141A can carry only 10 load pallets (approximately 20 tons).

The C-141B has a maximum takeoff weight of 156 tons (empty weight approximately 66 tons), maximum cruising speed of 910 km/h, and a service ceiling of more than 12,000 meters. Range (carrying a 42 ton payload) approximately 5,000 km, ferry range 10,300 km without in-flight refueling. Length 51.3 m, height 12.0 m. Wingspan 48.7 m. The aircraft is powered by four turbofan engines producing a thrust of 9,525 kg each. It can carry 154 troops with weapons; 123 paratroops in full gear; 80 wounded on stretchers and 8 medical personnel; up to 42 tons of various cargo.

The C-130 Hercules (Photo 3) is the most widely-used turboprop medium military transport aircraft in the capitalist world. It is built by the U.S. company Lockheed and has been in production since 1954. A total of approximately 1,700 units of various modifications have been built. More than 1,000 were delivered to the U.S. armed forces, and the remainder to the air forces of more than 50 countries. It is an all-metal high-wing monoplane with a straight wing, conventional tail, and tricycle landing gear. It is powered by four 4,508 horsepower turboprop engines. Internal fuel capacity 26,344 l, two external tanks of 5,146 l each. The fuselage is divided into two main compartments. The forward compartment contains the flight deck, with cargo or personnel carried in the rear compartment. The compartments are pressurized and air-conditioned.

The latest version of the Hercules, the C-130H, has a maximum takeoff weight of 79.4 t (empty weight 34.4 t), maximum payload 19.7 t, cruising speed 603 km/h. Its service ceiling is 10,000 m (at a flying weight of 59 t). Range with maximum internal and external-tank fuel reserve with 7.3 ton payload -- 7,600 km. Length 29.8 m, height 11.66 m. Wingspan 40.41 m. Several dozen C-130H aircraft were upgraded (fuselage lengthened, new onboard equipment installed). They were redesignated Hercules C.3 (Photo 3). This aircraft can now carry up to 128 troops with weapons; 92 paratroops; 97 wounded on stretchers, while the figures prior to upgrading were 92, 64, and 74 respectively.

The French aircraft company Aerospatiale and West Germany's Messerschmitt-Boelkow-Blohm jointly developed the C-160 Transall turboprop medium military transport aircraft (Photo 4). It entered regular production in 1967. One hundred and seventy of these aircraft were built by 1972. They are in service with the air forces of the FRG, France, Turkey, and South Africa.

The C-160 is a high-wing monoplane with a semi-monocoque fuselage, a straight wing, a conventional tail unit and a tricycle landing gear. The fuselage is divided into two compartments: flight deck, and a 140 cu m cargo area. The compartments are pressurized and air-conditioned.

The aircraft is powered by two 6,100 horsepower turboprop engines with four-blade reversible-pitch propellers. Two 2,200 kg thrust JATO units are mounted under the wing to assist in taking off from short runways and high-altitude fields (up to 5,000 m above sea level). Maximum takeoff weight 51 tons (empty -- 29 t). Cruising speed 540 km/h at 8,000 meters. Maximum payload 16 tons.

Service ceiling with both engines running 8,500 m, single-engine operation 4,150 m. Range with 10 percent fuel reserve, maximum payload -- 1,175 km, 4,500 km with 8 ton payload. Aircraft length 32.4 m, height 11.65 m. Wingspan 40 m, wing area 160 sq m. Aircraft load capacity in troop transport configuration: 93 troops with weapons; 81 paratroops; 62 wounded on stretchers plus four attending medical personnel.

According to reports in the Western press, the French company Aerospatiale has signed a contract and has proceeded to build an improved C-160 aircraft equipped with an aerial refueling system. Plans call for building 50 of these aircraft, 25 for France and 25 for Egypt.

The Japanese company Kawasaki has developed and is building the C-1 turbofan medium military transport aircraft (Photo 5). It is a high-wing monoplane and a semi-monocoque fuselage, swept wing, T-tail, and tricycle landing gear. The fuselage is divided by a special bulkhead into a flight deck (5-man crew) and a cargo cabin. Both are pressurized and air-conditioned. This aircraft can carry 60 troops with weapons; 45 paratroops; 36 sick and wounded on stretchers plus several attendants; up to 12 tons of cargo. The aircraft is powered by two turbofans each producing a maximum thrust of 6,575 kg.

Maximum takeoff weight 45.0 t (empty weight 24.1 t). Fuel capacity 15,200 l. Maximum speed at high altitude more than 800 km/h (cruising speed 620-700 km/h), service ceiling 11,600 m (service ceiling, one engine out -- 5,500 m). Range with maximum fuel and 2,300 kg payload -- 3,350 km; with 8,000 kg payload -- 1,300 km. Aircraft length 29.2 m, height 10.0 m. Wingspan 30.5 m. More than 30 of these aircraft are in service with Japan's air force.

The Italian company Aeritalia has been building the G-222 turboprop medium military transport aircraft since 1975 (Photo 6). In addition to the Italian Air Force, these aircraft are in service with Argentina, Venezuela, Somalia, and a number of other countries. In the spring of 1982 total orders for these aircraft reached 74 units.

The G-222 is a high-wing monoplane with a semi-monocoque fuselage, straight wing, single-fin tail unit, and tricycle landing gear. Powerplant: two turboprop engines developing a maximum of 3,400 horsepower each. Flight deck and cargo compartment are pressurized and air-conditioned. This aircraft can carry 53 troops with weapons; 42 paratroops; 36 wounded on stretchers; various cargo.

Maximum takeoff weight 28 tons (empty weight 14.6 t), payload 9 t. Maximum speed 540 km/h (at an altitude of about 500 m), cruising speed 440 km/h (at an altitude of 6,000 m). Service ceiling 7,620 m (5,000 m with one engine out). Fuel capacity 12,000 l. Range with maximum payload 1,370 km, when carrying 53 troops -- 2,400 km (ferry range in excess of 4,600 km). Aircraft length 22.7 m, height 9.8 m. Wingspan 28.7 m.

In addition to these aircraft, a fairly large number of obsolete medium turboprop and even piston military transport aircraft, as well as a large number of light aircraft, are in service with the air forces of capitalist countries. In addition to their principal function, military transport

aircraft in the United States and other countries, following appropriate modification, are used to perform various other missions. They can plant mines, conduct electronic warfare, perform search and rescue duty, fight fires, strike ground or sea targets, and conduct air reconnaissance.

Military transport aviation plays an important role in the aggressive policy of militant circles in the United States and the other NATO member nations. They transport troops, arms and equipment by transport aircraft to regions of "their vital interests." This was the case in Korea and Vietnam, Africa and Grenada, to which the sinister wings of transport aircraft carried elite cutthroats, who instituted a reign of terror and genocide in these countries.

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